



**Paulson-Cheek Mechanical**  
6145 Northbelt Parkway  
Suite F  
Norcross, GA 30071

770. 729. 0076  
770. 729. 1076 Fax

# **Saint Michael The Archangel Catholic Church Woodstock, GA**

## **HVAC Record Submittal November 24, 2014**

<b>General Contractor:</b>	The Winter Construction Company, Inc.
<b>Mechanical Engineer:</b>	Leppard Johnson & Associates, PC
<b>Mechanical Contractor:</b>	Paulson-Cheek Mechanical, Inc.

<u>Section</u>	<u>Description</u>
1	Split System Units
2	Roof Top Unit
3	Ductless Split System
4	Ceiling, Kitchen and Make-Up Exhaust Fans
5	Wall Caps for Exhaust Fans
6	Motor Operated Dampers
7	Manual Volume Dampers
8	Fire Dampers
9	Line Dampers

10	Wall Louvers
11	Grilles, Registers & Diffusers with Plenums and Cable-Operated Dampers
12	Take-Off Fittings
13	Flexible Ductwork
14	Controls



100 Crescent Centre Parkway, Suite 750  
Tucker, Georgia 30084  
Phone: (770) 270-1588  
Fax: (770) 270-9588  
E-Mail: [lja@leppardjohnson.com](mailto:lja@leppardjohnson.com)

## Transmittal Letter

**To:** Brian Rucks – Sizemore Group

**Project:** St. Michael the Archangel 13067

**Date:** 2014-7-29

**Herewith enclosed:** Submittals-HVAC      **For:**      **Via:** Email

<b>Copies</b>	<b>Description</b>
1	HVAC submittal review document

### Comments:

All motor acoustical data should be submitted to the Acoustic Consultant for review.  
Kitchen exhaust and makeup air should be submitted to the Kitchen Consultant for review.

Thank you,

Pam Immekus



Leppard Johnson & Associates, PC

St. Michael the Archangel  
LJA Project Number: 13067  
HVAC Equipment

## SUBMITTAL REVIEW

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### Contractor Submittal:

- Date: 7-15-2014
  - Project No. / Name:
  - Prepared by: Paulson Cheek Mechanical-Carden Clark
  - Reviewed by: Winter Construction
- 

Corrections or comments made relative to submittals during this review do not relieve the Contractor from compliance with the requirements of the Contract requirements. This check is only for review of general conformance with the design concept of the project and general compliance with the information given in the Contract Documents. The Contractor is responsible for confirming and correlating all qualities and dimensions; selecting fabrication processes and techniques of construction; coordinating work between trades, and performing work in a safe and satisfactory manner.


Review is for general compliance with Contract Documents. No responsibility is assumed for correctness of dimensions or details.

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The following section contains specific review comments with abbreviated notations from the table below. These abbreviations (Code) are intended to indicate whether submitted items are in general compliance with Contract Documents or actions that maybe required by the Contractor.

NO EXCEPTIONS TAKEN <sup>1</sup>	<b>NET</b>
MAKE CORRECTIONS NOTED <sup>1</sup>	<b>MCN</b>
AMEND & RESUBMIT <sup>2</sup>	<b>A&amp;R</b>
REJECTED – SEE REMARKS	<b>REJ</b>

1. Resubmission is not required. 2. Resubmit only items noted.

  
Signature

7-29-2014  
Date

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### GENERAL NOTES:

1. Contractor is to coordinate installation requirements with other trades.
2. Contractor is to coordinate all electrical requirements (including service voltage) with Electrical Installer.





Leppard Johnson & Associates, PC

St. Michael the Archangel  
LJA Project Number: 13067  
HVAC Equipment

## REVIEW COMMENTS OR CORRECTIONS:

	Material/ Equipment	Code	COMMENTS/CORRECTIONS
1	Split Systems AHU/CU 1 THRU 5, FCU/CU 6 & 9	MCN	<ol style="list-style-type: none"> <li>1. Provide SS drain Pans</li> <li>2. Provide low leakage outside air dampers on mixing boxes.</li> <li>3. Manufacture to size refrigerant lines</li> <li>4. Provide 5 year warranty on compressor and condenser coil leaks.</li> <li>5. FCU-6 min. of 3 steps for heat.</li> <li>6. FCU-9 min. of 2 steps of heat</li> <li>7. All units to have min. of MERV-11 Filters.</li> <li>8. Acoustical data to be approved by Acoustic Consultant.</li> </ol>
2	Rooftop Unit	MCN	<ol style="list-style-type: none"> <li>1. Coordinate roof curb with slope of roof.</li> <li>2. Electric heat shall be minimum of 2 steps.</li> <li>3. Provide single point connection with unit mounted disconnect switch.</li> </ol>
3	Ductless Split System	MCN	See GENERAL NOTS 1 & 2.
4	Kitchen Vent System	MCN	TO BE REVIEWED BY KITCHEN DESIGNER WHO SELECTED UNITS Note: Voltage on submittal for fans indicates 208V/3Ph, electrical dwgs have 120V/1Ph – Hp on makeup air fan is different from electrical drawings.
5	Wall Caps		Not required for review
6	Motor Operated Dampers	MCN	Not required for review - See GENERAL NOTS 1 & 2.
7	Manual Volume Dampers		Not required for review
8	Fire Dampers	MCN	See GENERAL NOTES 1.
9	Line Dampers		Not required for review
10	Louvers	MCN	TO BE REVIEWED BY ARCHITECT
11	Grilles & Diffusers	MCN	(A) See architectural ceiling plan for ceiling types. (E) Coordinate with architect for frame types. (C & D) Not submitted
12	Take-off Fittings		Not required for review
13	Flexible Ductwork		Not required for review
4A	Ceiling Fans	MCN	See GENERAL NOTS 1 & 2.



**Leppard Johnson & Associates, PC**

*St. Michael the Archangel  
LJA Project Number: 13067  
HVAC Equipment*

### **End of Submittal Review**

Form Rev. 12/10 K:\0Admin\FORMS\Construction Administration\Submittal Review Form.docx



# HVAC Submittal Cover Sheet

**SECTION: 1**  
**PRODUCT: Split System Units**

**APPROVED**

Paulson-Cheek Mechanical, Inc.  
6145 Norhtbelt Parkway, Suite F  
Norcross, GA 30071

PHONE: 770-729-0076  
FAX: 770-729-1076

PROJECT: **Saint Michael The Archangel  
Catholic Church**  
LOCATION: **Woodstock, GA**

Paulson-Cheek Mechanical, Inc.

ARCHITECT'S/ENGINEER'S STAMP

**Paulson-Cheek Mechanical, Inc.**

DATE RECEIVED: 05/30/14  
MANUFACTURER: Carrier  
SUPPLIER: Mingledorff's  
SUBMITTED DATE: 05/30/14

☒ NO ERRORS DETECTED

☐ CORRECT EXCEPTIONS NOTED

THIS APPROVAL OF SHOP DRAWINGS DOES  
NOT RELIEVE THE SUBCONTRACTOR OR VENDOR  
FROM THE REQUIREMENTS OF THE CONTRACT  
DOCUMENTS.

CHECKED BY: Carden Clark  
DATE CHECKED: 02/04/14



Turn to the Experts™

Carrier Complete Systems

An Agency of Mingledorff's, Inc.

Carrier Complete Systems

6675 Jones Mill Court  
Norcross, Georgia 30092

(P) 770-239-2122

(F) 770-239-2100

## SUMMARY

Attention: Danny Brooks

Fax Number:

Account: 100012

Customer: Paulson-Cheek Mechanical

Address:

Date: 05/30/2014

Quote Number: DM140288

Engineer: Leppard, Johnson & Associate (Ben A. Leppard)

Job Name: St Michael Archangel Church

Job Location: Gainesville, GA

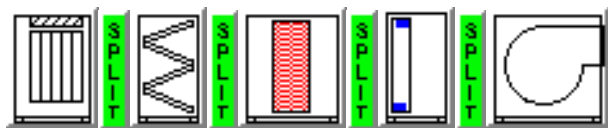
We propose to furnish the equipment listed below at prices stated and in accordance with Carrier Complete Systems' standard terms of sale.

Mark For	Qty	Model Number	Description
AHU-5	1	39MJ1608LJ1F55-M6X	39M AHU 08 <ul style="list-style-type: none"> <li>◆ Unit Parameters</li> <li>◆ Aero Indoor Air Handler</li> <li>◆ Unit Size: Size 08</li> <li>◆ Insulation: R-13 Double Wall Sealed Panel</li> <li>◆ Exterior Finish: Galvanized Exterior Panels</li> <li>◆ Interior Finish: Galvanized Interior Panels</li> <li>◆ Level I Thermal Break</li> <li>◆ 6 inch tall Base Rail</li> <li>◆ Mixing Box</li> <li>◆ Angle Filter</li> <li>◆ Electric Heat Section</li> <li>◆ Direct Expansion Coil</li> <li>◆ Draw-Thru Supply Fan</li> <li>◆ Configuration Notes</li> </ul>
AHU-1	1	39MJ1617F5GM55BBBQ	39M AHU 17 <ul style="list-style-type: none"> <li>◆ Unit Parameters</li> <li>◆ Aero Indoor Air Handler</li> <li>◆ Unit Size: Size 17</li> <li>◆ Insulation: R-13 Double Wall Sealed Panel</li> <li>◆ Exterior Finish: Galvanized Exterior Panels</li> <li>◆ Interior Finish: Galvanized Interior Panels</li> <li>◆ Level I Thermal Break</li> <li>◆ 6 inch tall Base Rail</li> <li>◆ Mixing Box</li> <li>◆ Angle Filter</li> <li>◆ Electric Heat Section</li> <li>◆ Direct Expansion Coil</li> <li>◆ Draw-Thru Supply Fan</li> <li>◆ Configuration Notes</li> </ul>
AHU-3,4	2	39MJ1608G2F655-M61	39M AHU 08 <ul style="list-style-type: none"> <li>◆ Unit Parameters</li> <li>◆ Aero Indoor Air Handler</li> <li>◆ Unit Size: Size 08</li> <li>◆ Insulation: R-13 Double Wall Sealed Panel</li> <li>◆ Exterior Finish: Galvanized Exterior Panels</li> <li>◆ Interior Finish: Galvanized Interior Panels</li> <li>◆ Level I Thermal Break</li> </ul>

			<ul style="list-style-type: none"> <li>◆ 6 inch tall Base Rail</li> <li>◆ Mixing Box</li> <li>◆ Angle Filter</li> <li>◆ Electric Heat Section</li> <li>◆ Direct Expansion Coil</li> <li>◆ Draw-Thru Supply Fan</li> <li>◆ Configuration Notes</li> </ul>
AHU-2	1	39MJ1617C8R755BBB7	39M AHU 17 <ul style="list-style-type: none"> <li>◆ Unit Parameters</li> <li>◆ Aero Indoor Air Handler</li> <li>◆ Unit Size: Size 17</li> <li>◆ Insulation: R-13 Double Wall Sealed Panel</li> <li>◆ Exterior Finish: Galvanized Exterior Panels</li> <li>◆ Interior Finish: Galvanized Interior Panels</li> <li>◆ Level I Thermal Break</li> <li>◆ 6 inch tall Base Rail</li> <li>◆ Mixing Box</li> <li>◆ Angle Filter</li> <li>◆ Electric Heat Section</li> <li>◆ Direct Expansion Coil</li> <li>◆ Draw-Thru Supply Fan</li> <li>◆ Configuration Notes</li> </ul>
CU 3-5	3	38AUDB12A0A6-0A0A0	Scroll Compressor Air-Cooled Condensing Unit, Dual Circuit 10 Tons Cooling <ul style="list-style-type: none"> <li>◆ Al/Cu Condenser Coil</li> <li>◆ Low Ambient Controls</li> </ul>
	3	CALVHLGD011A00	Louvered Condenser Coil Hail Guard for Outdoor Unit
	6	EF680033	Liquid Line Solenoid Valve for Outdoor Unit
	6	EF680037	Liquid Line Solenoid Valve for Outdoor Unit
	6	KM680008	Sight Glass for Outdoor Unit
CU-1,2	2	38AUDB25A0A6-0A0A0	Scroll Compressor Air-Cooled Condensing Unit, Dual Circuit 20 Tons Cooling <ul style="list-style-type: none"> <li>◆ Al/Cu Condenser Coil</li> <li>◆ Low Ambient Controls</li> </ul>
	2	CALVHLGD009A00	Louvered Condenser Coil Hail Guard for Outdoor Unit
	4	KM680004	Sight Glass for Outdoor Unit
	4	EF680035	Liquid Line Solenoid Valve for Outdoor Unit
	4	EF680037	Liquid Line Solenoid Valve for Outdoor Unit
	6	EF680033	Liquid Line Solenoid Valve for Outdoor Unit
	6	EF680037	Liquid Line Solenoid Valve for Outdoor Unit
	6	KM680008	Sight Glass for Outdoor Unit
AHU CU 10	1	24ABB324A003	24ABB Comfort Series Air Conditioner with Puron Refrigerant 2 Tons Cooling
	1	KAACH1401AAA	Crankcase Heater
	1	KAALP0401PUR	Low Pressure Switch
	1	KSALA0301410	Low-Ambient Pressure Switch
	1	KAAWS0101AAA	Winter Start Control
	1	FX4DNF025T05	FX4D Comfort Series Fan Coil with Puron 24000 BTU Cooling
	1	KFCEH0801N08	8 kW, Electric Heater, Non-fused, 1 phase, with relays
FCU/CU-6	1	24ABB348A006	24ABB Comfort Series Air Conditioner with Puron Refrigerant 4 Tons Cooling
	1	KAACH1901AAA	◆
	1	KAALP0401PUR	Low Pressure Switch
	1	KSALA0301410	Low-Ambient Pressure Switch
	1	KAAWS0101AAA	Winter Start Control
	1	FX4DNF049T00	FX4D Comfort Series Fan Coil with Puron 48000 BTU Cooling
	1	KFCEH1601315	15 kW, Electric Heater, Non-fused, Stageable, with relays
AHU CU 7 8	2	24ABB318A003	24ABB Comfort Series Air Conditioner with Puron Refrigerant 1.5 Tons Cooling
AHU CU 7 8	2	KAACH1401AAA	Crankcase Heater

AHU CU 7 8	2	KAALP0401PUR	Low Pressure Switch
	2	KSALA0301410	Low-Ambient Pressure Switch
	2	KAAWS0101AAA	Winter Start Control
	2	FX4DNF019L00	FX4D Comfort Series Fan Coil with Puron 18000 BTU Cooling
	2	KFCEH0801N08	8 kW, Electric Heater, Non-fused, 1 phase, with relays
AHU CU- 9	1	24ABB336A006	24ABB Comfort Series Air Conditioner with Puron Refrigerant 3 Tons Cooling
	1	KAACH1501AAA	Crankcase Heater
	1	KAALP0401PUR	Low Pressure Switch
	1	KSALA0301410	Low-Ambient Pressure Switch
	1	KAAWS0101AAA	Winter Start Control
	1	FX4DNF037L00	FX4D Comfort Series Fan Coil with Puron 36000 BTU Cooling
	1	KFCEH1601315	15 kW, Electric Heater, Non-fused, Stageable, with relays
AHU CU 12	1	24ABB318A003	24ABB Comfort Series Air Conditioner with Puron Refrigerant 1.5 Tons Cooling
	1	KAACH1401AAA	Crankcase Heater
	1	KSALA0301410	Low-Ambient Pressure Switch
	1	KAALP0401PUR	Low Pressure Switch
	1	KAAWS0101AAA	Winter Start Control
	1	FX4DNF019L00	FX4D Comfort Series Fan Coil with Puron 18000 BTU Cooling
	1	KFCEH0501N05	5 kW, Electric Heater, Non-fused, 1 phase, with relays
	12	33CS2PP2S-03	Edge Pro splitable 7-Day Programmable/Non-Prog
RTU-1	1	50ES-A36---6	50ES Comfort 13 Packaged Air Cinditioner System with Puron 3 Tons Cooling 460-3-60
	1	CPMANDPR007A00	Manual Outside Air Damper
	1	CPFILTRK007A00	Internal Filter Rack
	1	CPLOUVER018A00	Louvered Metal Outdoor Coil Grilles
	1	CPRFCURB011A00	14 inch Common Flat Roof Curb
	1	CPHEATER062A00	11.3/15.0 kW, 460/480-3-60 volt, Electric Heater

Job Name	St Michael Archangel Church
Mark for	AHU-1
Date	May 30, 2014



### Unit Parameters

Aero Indoor Air Handler  
Unit Size: Size 17  
Insulation: R-13 Double Wall Sealed Panel  
Exterior Finish: Galvanized Exterior Panels  
Interior Finish: Galvanized Interior Panels  
Level I Thermal Break  
6 inch tall Base Rail

## Mixing Box

Shipping Split After  
Damper: Right Side Premium Opposed  
Damper: Top Premium Opposed

### Angle Filter

Shipping Split After  
Shipping Skid  
2In. Angle Filter  
Qty (12) 12in. x 24in.  
Door Right Side

### Electric Heat Section

Shipping Split After  
Factory Wired Panel Right Side  
56KW 480 Volts 3 Phase Unsheathed Element  
SCR Control

### Direct Expansion Coil

Shipping Split After  
Shipping Skid  
Standard Drain Pan Right Side  
Direct Expansion 16.93 sq.ft 4 Row 14 FPI Face Split Half Circuit  
Coil Connection Right Side  
1/2 in. Tube Diameter  
AL fins Galv. Casing

Job Name      St Michael Archangel Church  
Mark for      AHU-1  
Date          May 30, 2014

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No Coating

R-410A

### **Draw-Thru Supply Fan**

Rear Inlet

Fan Sled

Forward Curve B FCA18\_18A

907 fanRPM Class I

Top Horiz. Front Discharge

Right Side Fan Motor Location

Spring Fan Isolation

Motor

5 HP Premium Efficiency ODP 208-230/460 3Ph 60Hz 1800 RPM

Manufacturer - Generic

Frame Size - 184T

Motor Shaft Diameter (in.) - 1.125

Voltage Selected - 460/3/60

Full Load Amps - 6.5

MCA - 8.1

MOCP - 10

Efficiency - 89.5%

Belt Drive

1.2 Service Factor

Fixed Pitch Drive

1 or more belts

Starter

Combination Starter & Non-fused Disconnect 460 Volts 3 Phase 60Hz

Door Right Side

### **Configuration Notes**

Preheat coil configurations can cause freezstat to trip if the downstream cooling coil isn't drained in heating season and/or PID valve control loop is too slow to react.

Electric heaters must have 12" clearance upstream and downstream from field installed components.

Discharge duct(s) must be gasketed and screwed directly to the discharge panel of the unit.

### **Weights and Dimensions**

(LxWxH in ft in) 13' 9" x 7' 3" x 4' 2" \*\*

Operating 2983 LB \*\*

Weights and Dimensions are approximate. Weights include base unit weight, coils (wet & dry), fans and fan motors, and other components, but does not include filters, drives and skids. Approximate dimensions are provided primarily for shipping purposes. Shipping skids are not included.

All filter media efficiency ratings are for the filter media only.

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SUBJECT TO CHANGE WITHOUT NOTICE



## DX Coil Performance Summary

Project: Untitled  
Tag: AHU-1

DX Cooling Application's Balance Criteria: Total Cooling

Coil Model \_\_\_\_\_  
Split Type \_\_\_\_\_  
Row / FPI / Circ \_\_\_\_\_  
Face Area Type \_\_\_\_\_  
Coil Face Area \_\_\_\_\_  
Face Velocity \_\_\_\_\_  
Fin-Casing Material \_\_\_\_\_  
Tube Diameter \_\_\_\_\_  
Tube spacing: Stf x Str \_\_\_\_\_  
Tube Wall Thickness \_\_\_\_\_  
Actual Airflow \_\_\_\_\_  
Site Altitude \_\_\_\_\_  
Total Cooling Capacity \_\_\_\_\_  
Sensible Cooling Capacity \_\_\_\_\_  
Air Friction \_\_\_\_\_

Condensing Unit 38AUD025(D) (Circuit B, Upper Connections)

Nozzle Size \_\_\_\_\_

**Note: Nozzle Factory Supplied and Installed**

Number of TXV's \_\_\_\_\_  
TXV Tonnage \_\_\_\_\_  
Sat. Suction Temp. \_\_\_\_\_  
Sat. Cond. Temp. \_\_\_\_\_  
Tons Per Circuit \_\_\_\_\_

Condensing Unit 38AUD025(D) (Circuit A, Lower Connections)

Nozzle Size \_\_\_\_\_

**Note: Nozzle Factory Supplied and Installed**

Number of TXV's \_\_\_\_\_  
TXV Tonnage \_\_\_\_\_  
Sat. Suction Temp. \_\_\_\_\_  
Sat. Cond. Temp. \_\_\_\_\_  
Tons Per Circuit \_\_\_\_\_

Condensing Ent. Air Temp \_\_\_\_\_

Suction Line Loss \_\_\_\_\_

Compressor Power \_\_\_\_\_

Vapor Superheat \_\_\_\_\_

Liquid Sub-Cooling \_\_\_\_\_

Entering Air Dry Bulb \_\_\_\_\_

Entering Air Wet Bulb \_\_\_\_\_

Entering Air Enthalpy \_\_\_\_\_

Leaving Air Dry Bulb \_\_\_\_\_

Leaving Air Wet Bulb \_\_\_\_\_

Leaving Air Enthalpy \_\_\_\_\_

Accessory PD \_\_\_\_\_

Cond vs Evap \_\_\_\_\_

Vertical Separation \_\_\_\_\_

**Carrier 28ME**  
**Face Split (Dual Circuit)**  
**4 / 14 / HF**



**Large**  
**16.93** sqft  
**413.5** fpm  
**Al-Galv.**  
**0.5** in  
**1.25 x 0.781** in  
**0.016** in  
**7000** CFM  
**0** ft  
**237.08** MBH  
**179.00** MBH  
**0.46** in wg

**G8**

**1**  
**8**  
**49.2** F  
**120.5** F  
**1.26** Tons

**G6**

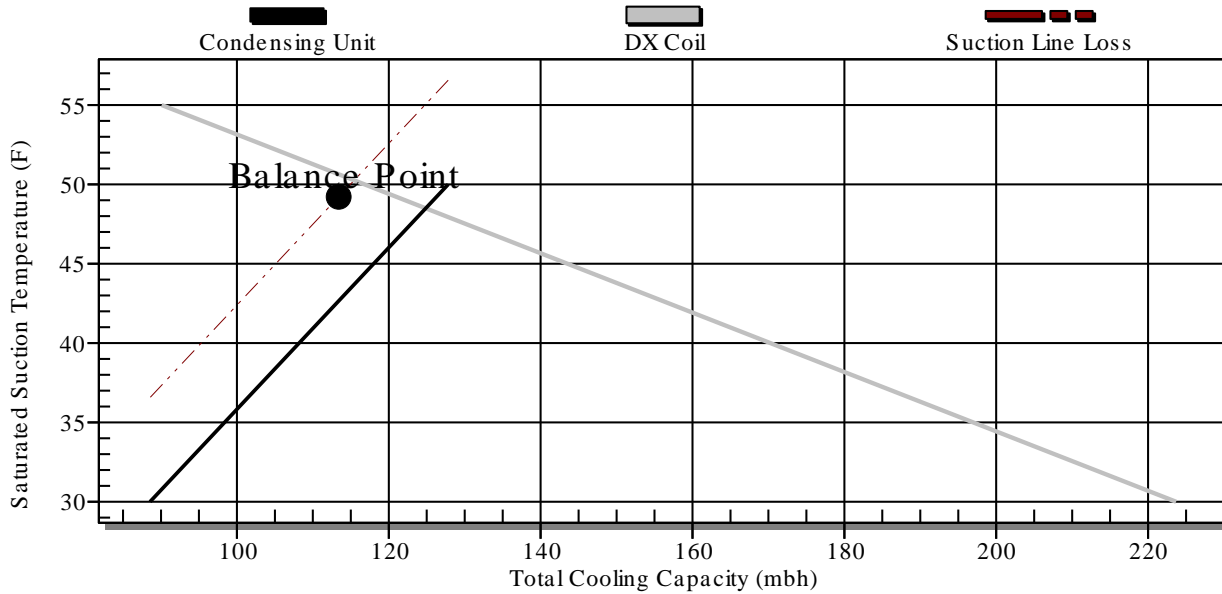
**1**  
**8**  
**47.0** F  
**120.0** F  
**1.38** Tons  
**95.0** F  
**2.7** F  
**16.8** kW  
**15.0** F  
**15.0** F  
**79.30** F  
**65.80** F  
**30.50** BTU/lb  
**55.92** F  
**54.69** F  
**23.0** BTU/lb  
**0.0** psig  
**Even**  
**0.0** ft

## DX Coil Performance Summary

Project: Untitled  
Tag: AHU-1

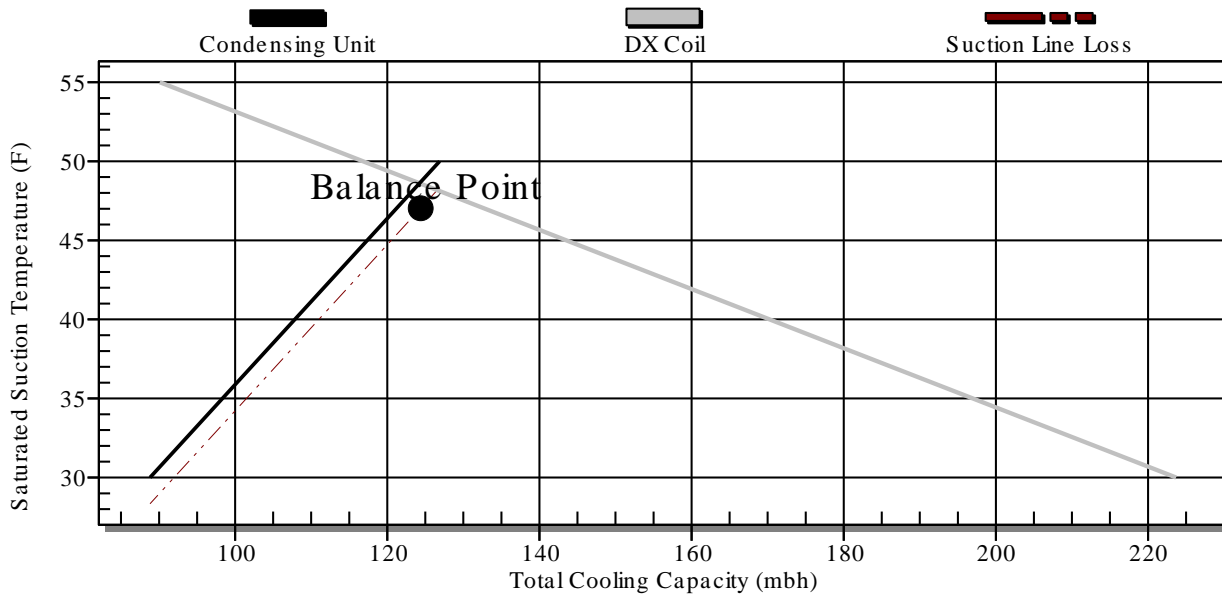
### DX Coil Cross-Plot

4 / 14 / HF 38AUD025(D) (Circuit B, Upper Connections)



### DX Coil Cross-Plot

4 / 14 / HF 38AUD025(D) (Circuit A, Lower Connections)



## Electric Heater Performance Summary

Project: Untitled  
Tag: AHU-1

Unit Size	17	
Coil Face Area	16.60	sqft
Face Velocity	421.7	fpm
Actual Airflow	7000	CFM
Minimum Airflow	5810	CFM
Altitude	0	ft
Heating Capacity	191.13	MBH
kW	56	kW
Voltage, 3 phase	480	
FLA	67	
MCA	84	
MOCP	90	
Subcircuits	2	
Ent. Air Temperature	70.00	F
Lvg. Air Temperature	94.82	F
Air Friction	0.01	in wg

# Supply Fan Performance Summary

Project: Untitled  
Tag: AHU-1

Fan Model **39M**  
Unit Size **17**  
Fan Type **FORWARD CURVED**  
Fan Wheel Diameter **18**  
Fan Class **I**  
Fan Application **Draw Thru**  
Orientation **Horizontal**  
Actual Airflow, CFM **7000**  
Site Altitude, ft **0**  
Upstream Ext. Static, in wg **0.00**  
Downstream Ext. Static, in wg **1.00**  
Cooling Coil Static, in wg **0.46**  
Heating Coil Static, in wg **0.00**  
Other Losses, in wg **0.00**  
Total Accessory Static, in wg **0.90**  
Total Static Pressure, in wg **2.36**  
Calculated Fan RPM / Motor RPM **907 / 1800**  
Class I Max. RPM **1097**  
Static Efficiency (%) **57**  
Fan BHP **4.5**

## Acoustic Data:

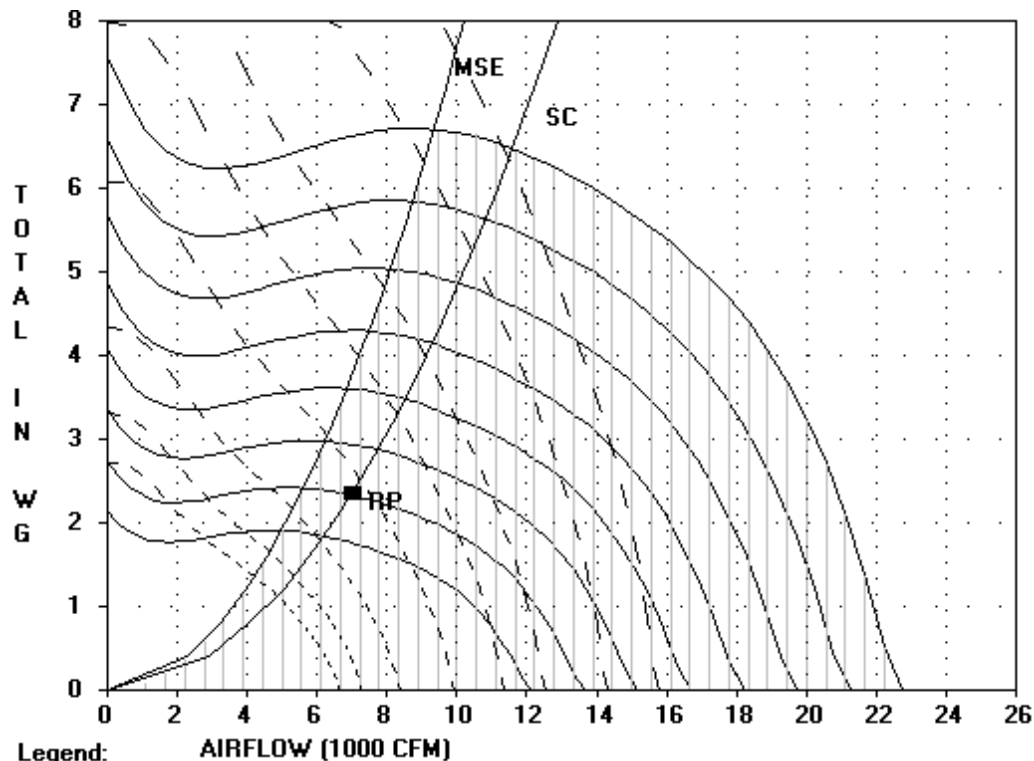
	Discharge	Inlet	Casing
63 Hz	91	83	82
125 Hz	82	75	73
250 Hz	80	65	64
500 Hz	80	64	64
1000 Hz	77	63	61
2000 Hz	73	59	57
4000 Hz	69	56	44
8000 Hz	62	46	37



Sound power levels for 39M units are rated in accordance with AHRI Standard 260.

## Accessories:

- (1) ANG Synthetic (2") MERV 13, Dirty [0.82]
- (1) Electric Heat [0.01]
- (1) Side Mixing or Exhaust Box [0.07]



Legend:

- RPM    - BHP    MSE - Max. Static Eff.    SC - System Curve    RP - Rated Point

RPM = 907    BHP = 4.5    CLASS I MAX. RPM = 1097

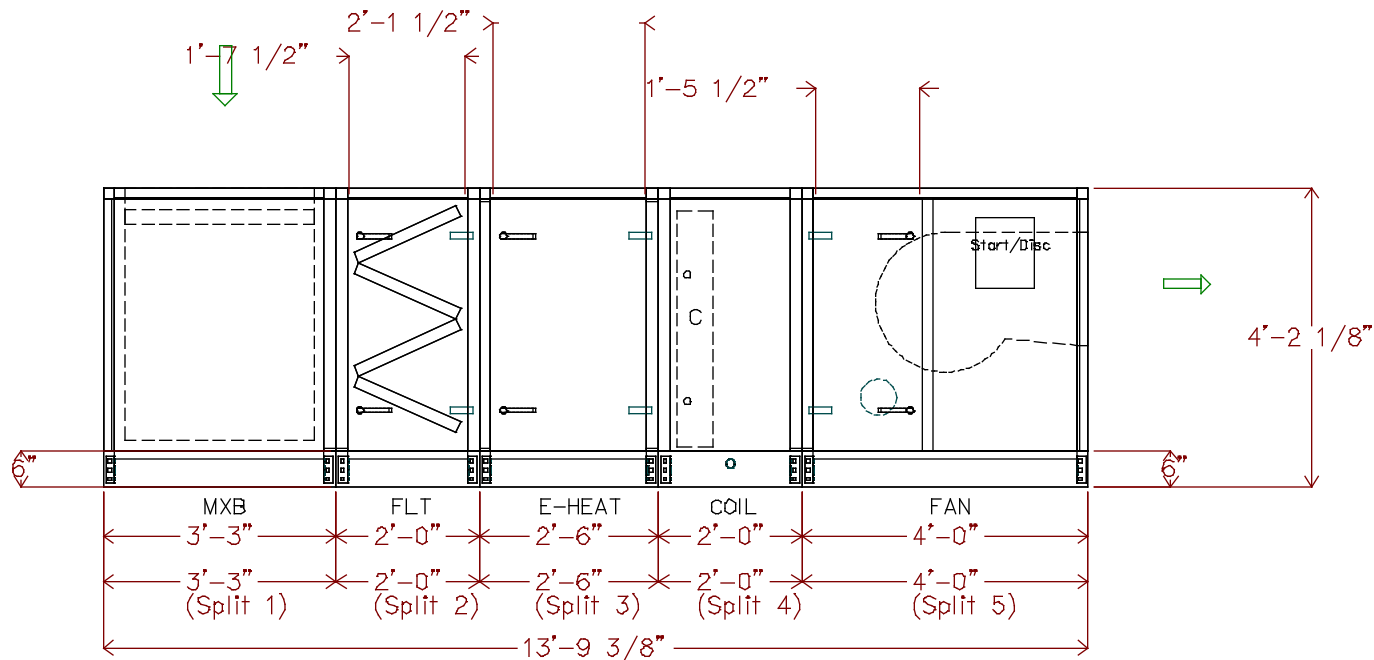
RPM's (x 100, L to R): 8 9 10 11 12 13 14 15

BHP's (L to R): 1.5 2 3 5 7.5 10 15 20

Unit width: 7'-3 9/16" (plus lifting lugs)  
 2in. Angle Filter  
 Qty (12) 12in. x 24in.  
 Direct Expansion 4 Row 14 FPI Face Split Half Circuit (qty. 1)  
 2 @ 0.875" diameter distributor(s)  
 Draw-Thru Supply Fan

5 HP Premium Efficiency ODP 208-230/460 3Ph 60Hz 1800 RPM  
 Operating weight: 2984.0 lbs.  
 Upstream Corner Weight (each): 646.0 lbs.  
 Downstream Corner Weight (each): 846.0 lbs.

Split	Airway Length	Weight (lbs.)
(Split 1)	3'-3"	473
(Split 2)	2'-0"	427
(Split 3)	2'-6"	438
(Split 4)	2'-0"	502
(Split 5)	4'-0"	1144



Carrier  
 A United Technologies Company

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39MN

DATE  
 5/30/2014

Configurator Ver.  
 v6.34 02/11/14

39M Central Station Air-Handler, Size 17  
 St Michael Archangel Church: AHU-1  
 Assembly Drawing

REVISION  
 Side View

Unit viewed from right side of side elevation view.  
 Unit length: 13'-9 3/8"  
 2in. Angle Filter  
 Qty (12) 12in. x 24in.  
 Direct Expansion 4 Row 14 FPI Face Split Half Circuit (qty. 1)  
 2 @ 0.875" diameter distributor(s)

Draw-Thru Supply Fan  
 5 HP Premium Efficiency ODP 208-230/460 3Ph 60Hz 1800 RPM  
 Operating weight: 2984.0 lbs.  
 Upstream Corner Weight (each): 646.0 lbs.  
 Downstream Corner Weight (each): 846.0 lbs.

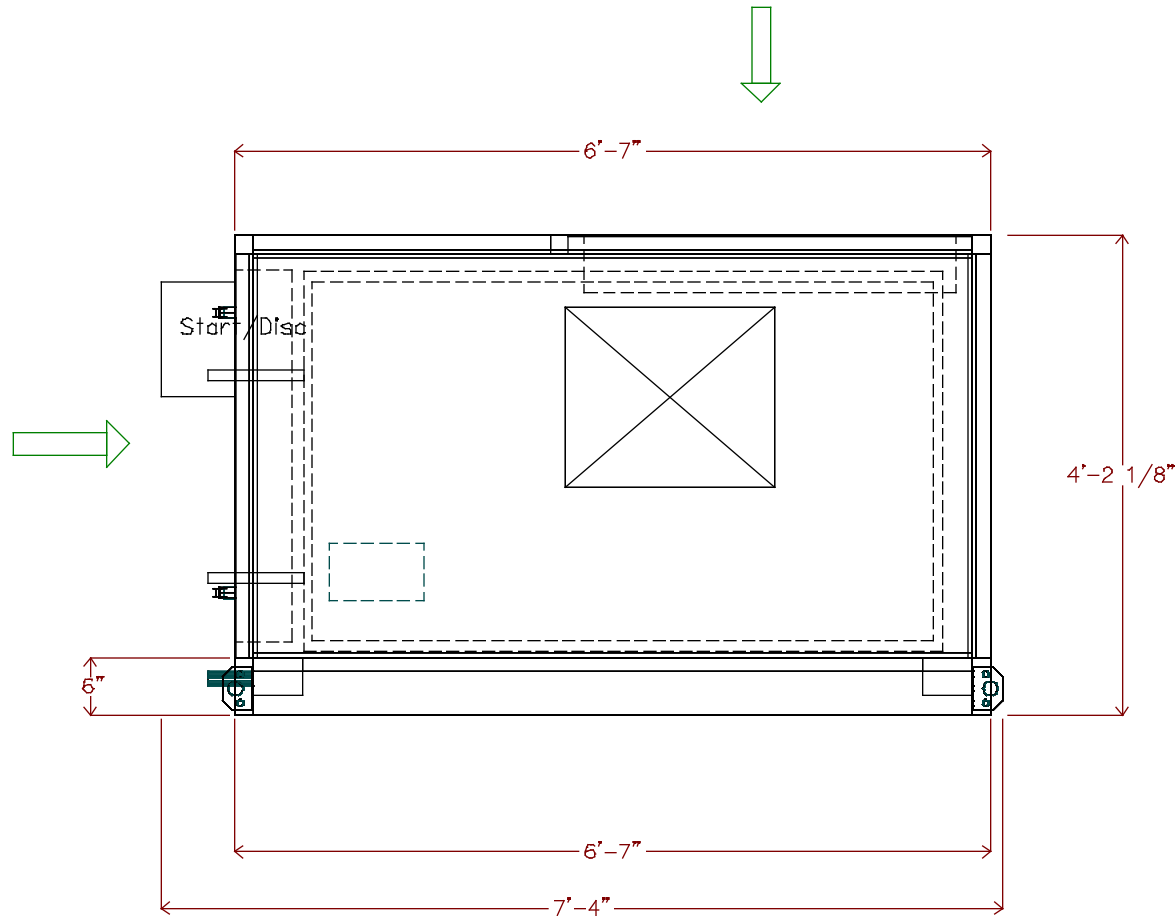


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DATE  
5/30/2014

Configurator Ver.  
v6.34 02/11/14

39M Central Station Air-Handler, Size 17  
 St Michael Archangel Church: AHU-1  
 Assembly Drawing

REVISION  
End View

Unit height: 4'-2 7/8"  
 2in. Angle Filter  
 Qty (12) 12in. x 24in.  
 Direct Expansion 4 Row 14 FPI Face Split Half Circuit (qty. 1)  
 2 @ 0.875" diameter distributor(s)  
 Draw-Thru Supply Fan

5 HP Premium Efficiency ODP 208-230/460 3Ph 60Hz 1800 RPM  
 Operating weight: 2984.0 lbs.  
 Upstream Corner Weight (each): 646.0 lbs.  
 Downstream Corner Weight (each): 846.0 lbs.

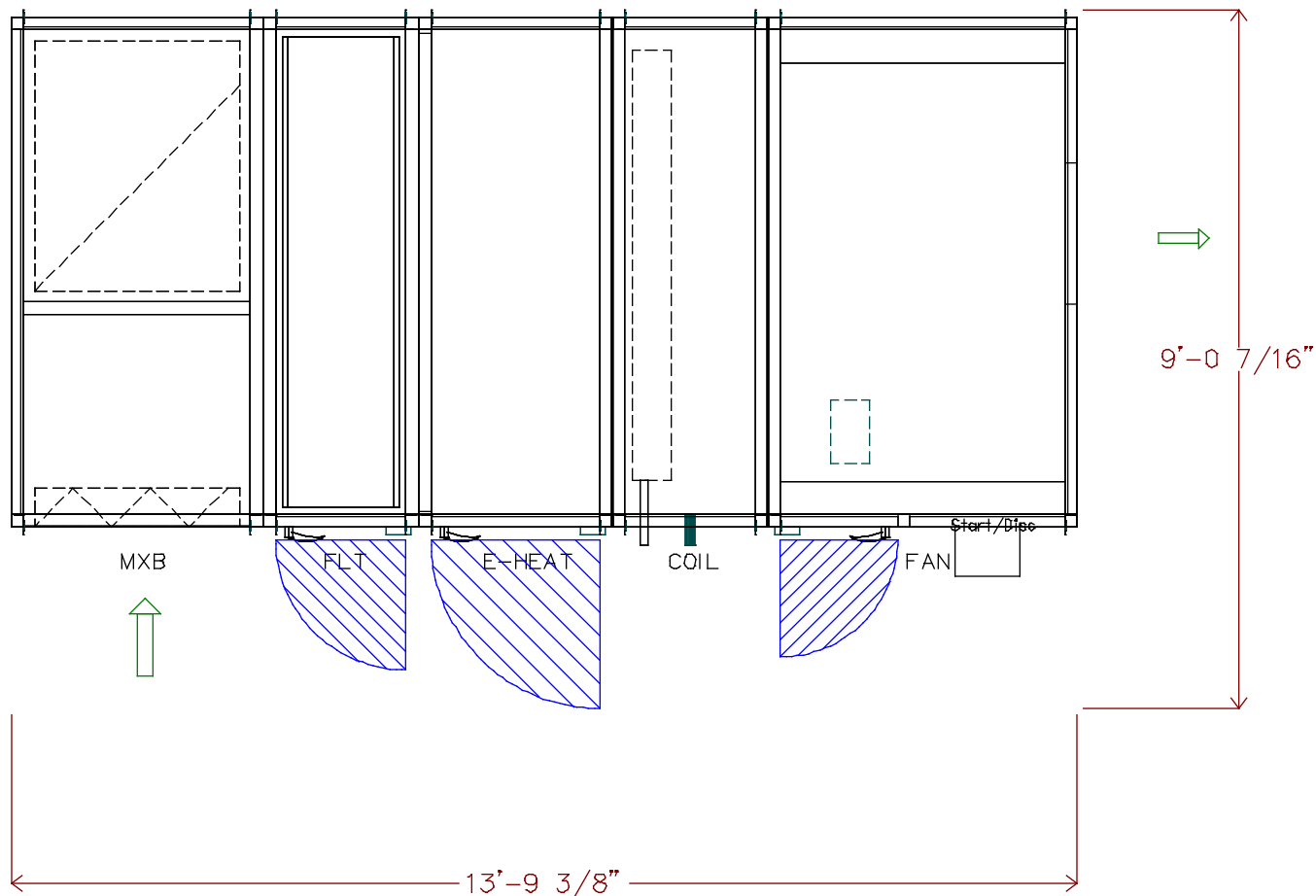


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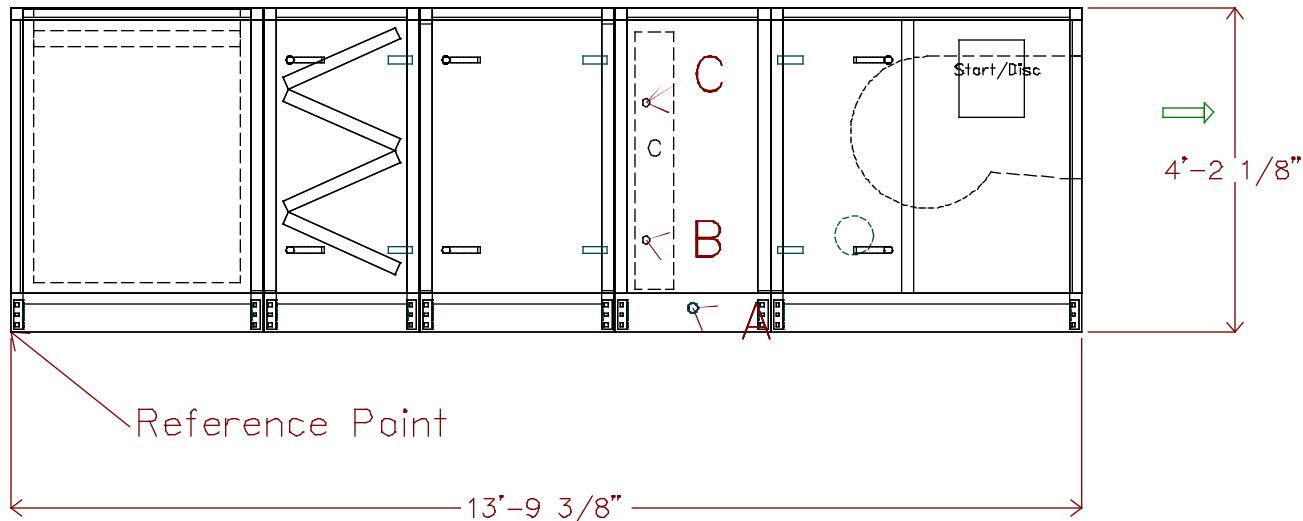
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39M Central Station Air-Handler, Size 17  
 St Michael Archangel Church: AHU-1  
 Assembly Drawing

REVISION  
 Top View

Direct Expansion 4 Row 14 FPI Face Split Half Circuit (qty. 1)  
 2 @ 0.875" diameter distributor(s)

Pipe	x	y	diameter	Usage
A	8'-9 5/16"	3 13/16"	1 1/2"	DrainPan
B	8'-2 1/8"	1'-2 1/4"	1 1/8"	Suction
C	8'-2 1/8"	2'-11 1/2"	1 1/8"	Suction



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 5/30/2014

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39M Central Station Air-Handler, Size 17  
 St Michael Archangel Church: AHU-1  
 Assembly Drawing

REVISION  
 Side View



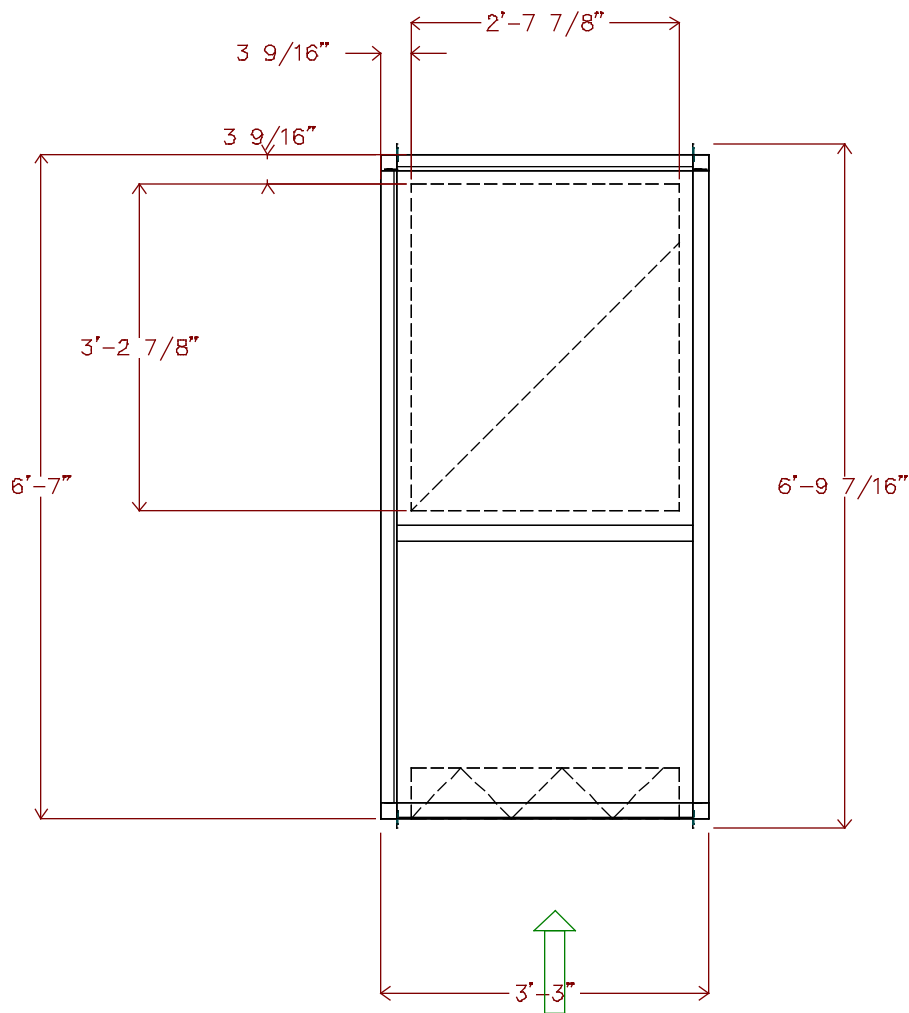


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39M Central Station Air-Handler, Size 17  
St Michael Archangel Church: AHU-1  
Mixing Box

REVISION  
Top View

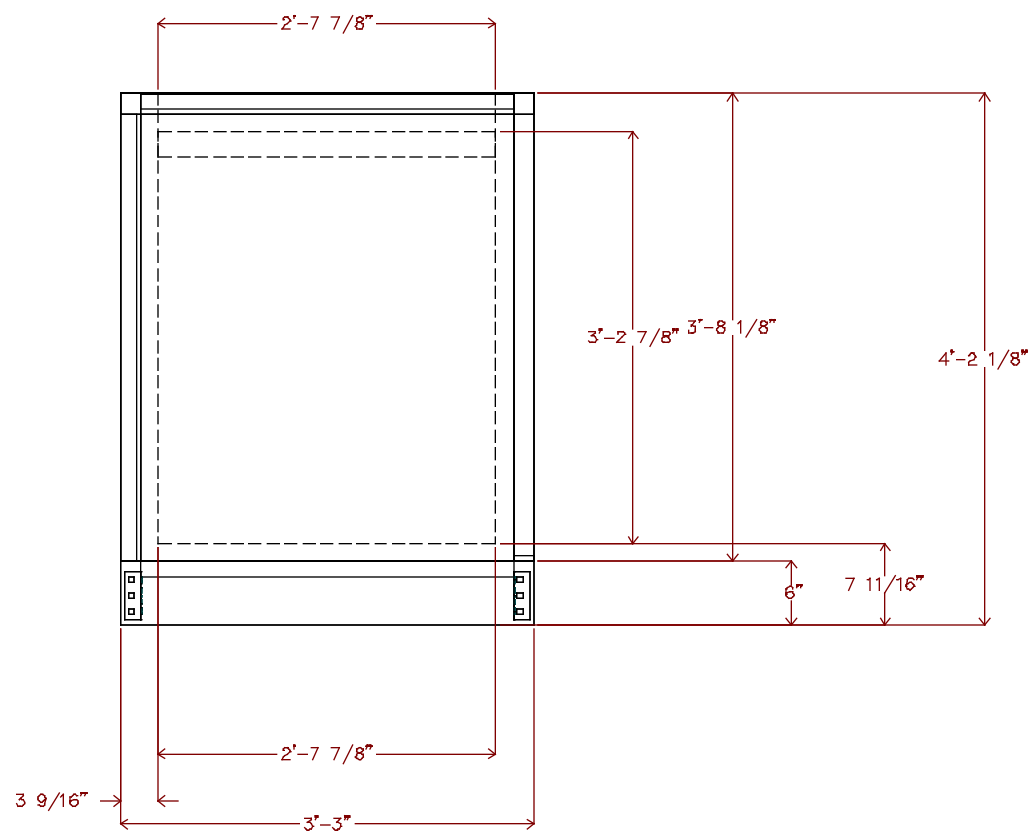


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39M Central Station Air-Handler, Size 17  
St Michael Archangel Church: AHU-1  
Mixing Box

REVISION  
Side View



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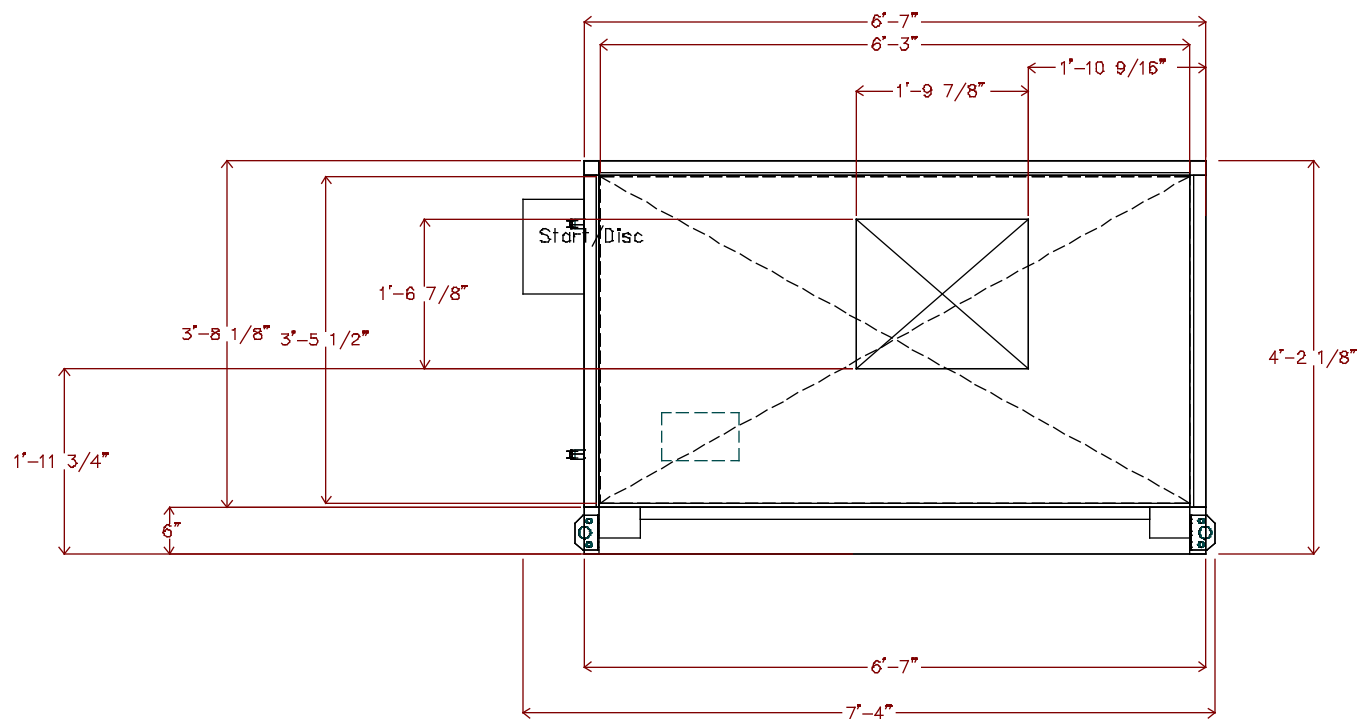
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Unit viewed from right side of side elevation view.

Draw-Thru Supply Fan

5 HP Premium Efficiency ODP 208-230/460 3Ph 60Hz 1800 RPM



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39M Central Station Air-Handler, Size 17  
St Michael Archangel Church: AHU-1  
Draw-Thru Supply Fan

REVISION  
End View

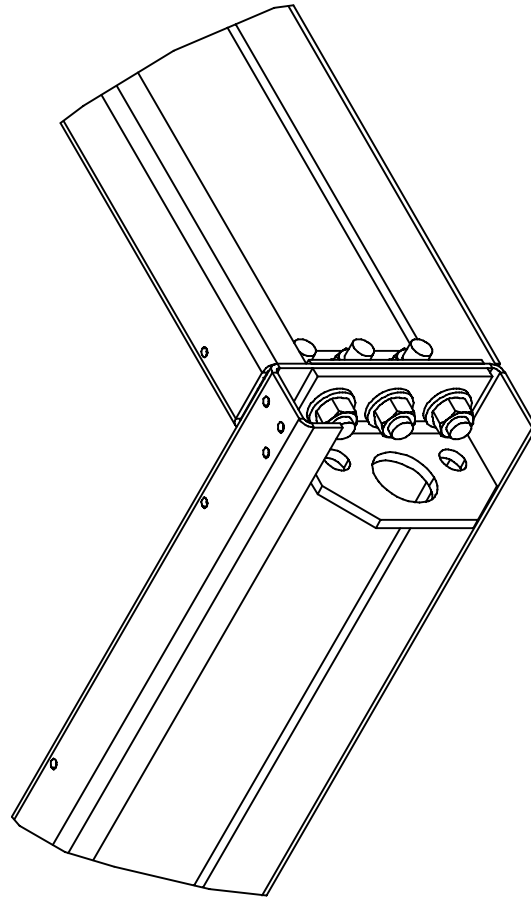
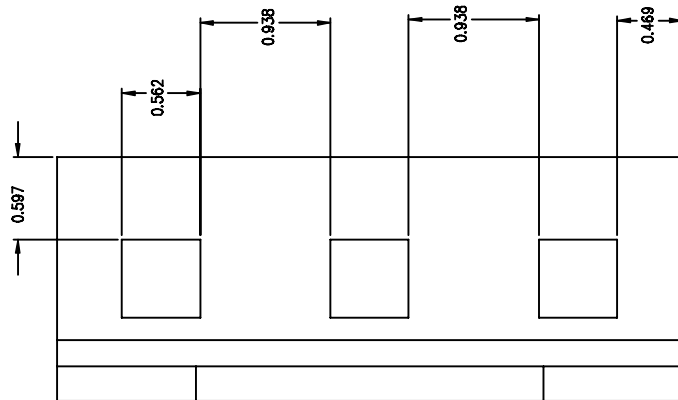
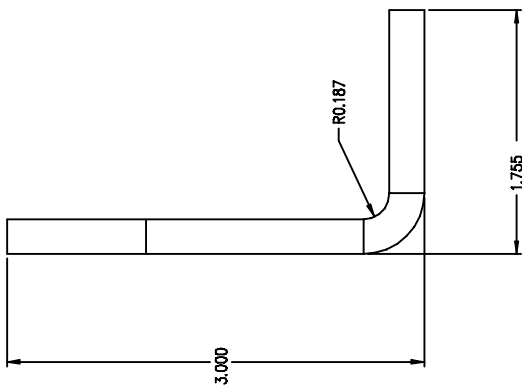
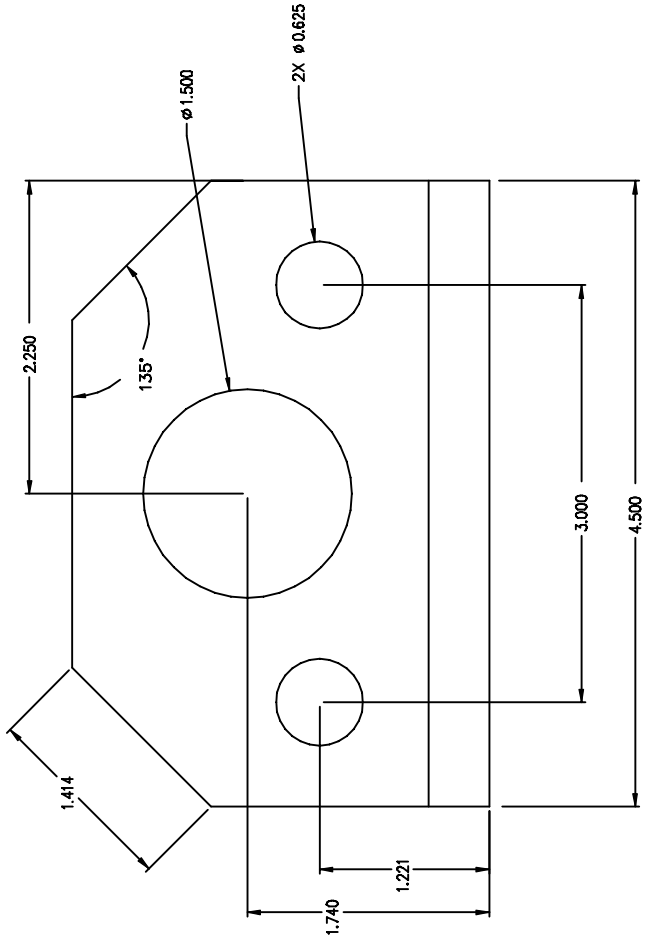


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REVISION

39M Central Station Air-Handler, Size: 03 - 110

6" Base rail and Lifting Lug Detail



Carrier

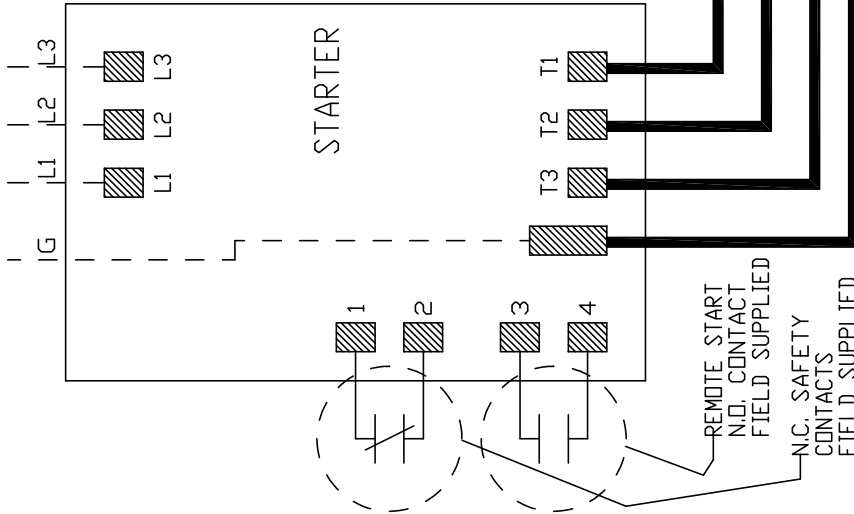
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39M

FIELD SUPPLIED WIRING  
PER "NEC" CODE



WIRING DIAGRAM  
STARTER  
3 PHASE

MOTOR

YELLOW  
BLUE  
BLACK

GREEN OR BARE COPPER

NOTES:

- 1) MOTOR CONNECTIONS L4 THRU L9 NOT SHOWN. CONNECT PER MOTOR MANUFACTURERS RECOMMENDATIONS AND SPECIFIED OPERATING VOLTAGE.
- 2) CHECK FOR CORRECT MOTOR ROTATION AFTER WIRING. TO REVERSE MOTOR ROTATION, REVERSE FIELD LINE VOLTAGE WIRING ON TERMINALS L1 AND L2.
- 3) REMOVE FACTORY INSTALLED JUMPER WIRE BETWEEN TERMINALS 1 AND 2 BEFORE CONNECTING SAFETY CONTACT (LTT/HPS).
- 4) FIELD WIRING MUST BE IN ACCORDANCE WITH "NEC" CODE AND LOCAL CODE REQUIREMENTS. REFER TO INSTALLATION INSTRUCTION FOR MINIMUM WIRE GAUGE REQUIREMENTS.
- 5) ALL FACTORY WIRING IS RATED FOR 90 DEGREES C, TYPE THHN. REPLACE WITH SAME SIZE AND TYPE AS ORIGINALLY SUPPLIED.

39MA51003756 -

39M Central Station Air-Handler, Size: 03 - 61  
Three Phase Starter Wiring Detail

REVISION

## Air Filter Submittal

Project: Untitled  
Unit Tag: AHU-1

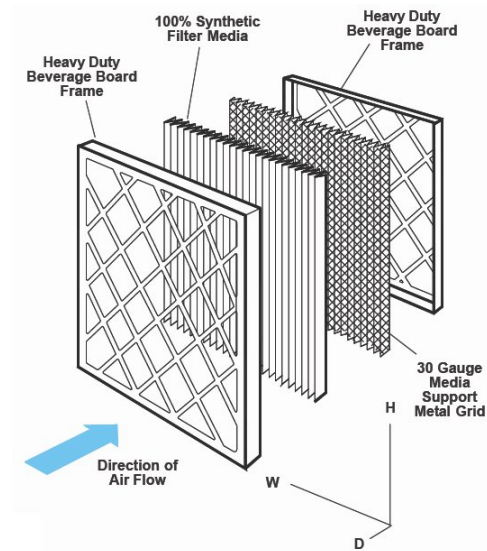
Carrier Part Number .....	31KFG39MD017822
Kit Description .....	Filter Kit, 2" ANG/FMB Pleated (MERV13), 39M017
Unit Airflow, CFM .....	7000
Filter Velocity, FPM .....	292
Filter Sizes and Quantities .....	Qty (12) 12in. x 24in.

## Quality Pleat

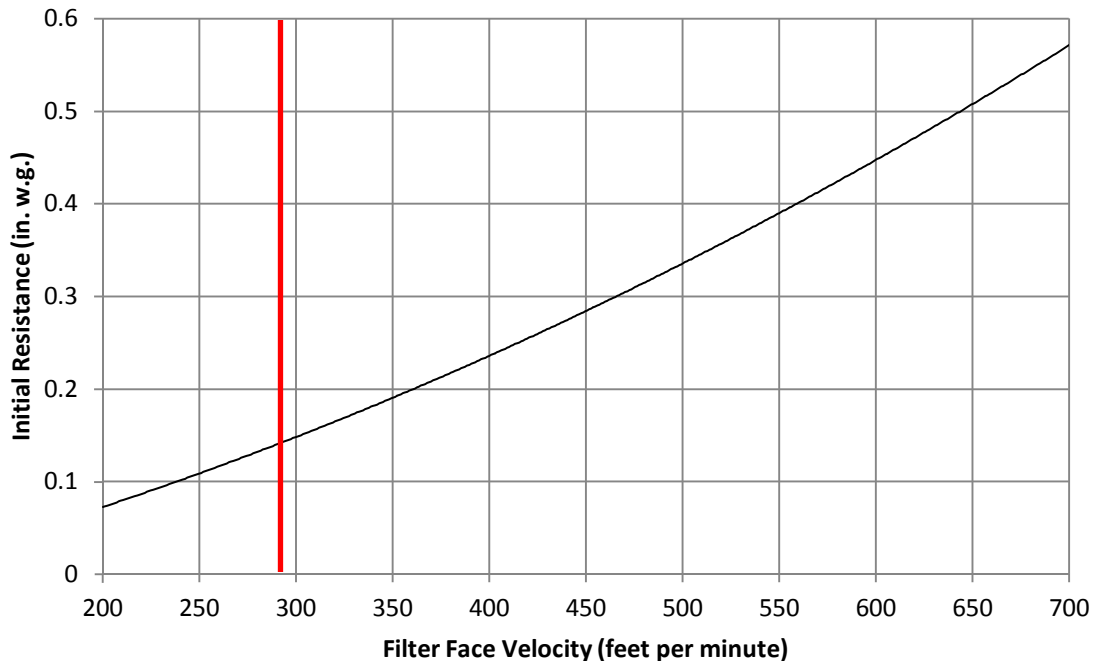
### MERV 13 Pleated Filter

The 100% synthetic graduated density media is continuously bonded to a 30 gauge galvanized, corrosion resistant, expanded metal support grid with an effective open area of 96%. The media is resistant to a wide range of chemicals, does not absorb moisture and will not support microbial growth.

The controlled pleat spacing maximizes surface area and dust holding capacity and is bonded to the enclosure frame to prevent dust bypass. The enclosure frame is constructed of high wet strength moisture resistant beverage board. The diagonal support members of the frame are bonded to the entering and exiting apexes of each pleat to prevent pleat collapse and filter bowing.

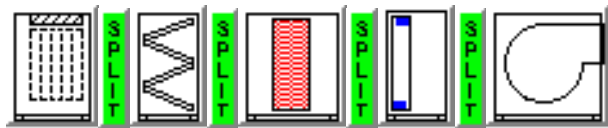


### Filter Pleated (2") MERV 13



Job Name      St Michael Archangel Church  
Mark for      AHU-2  
Date          May 30, 2014

---



#### **Unit Parameters**

Aero Indoor Air Handler  
Unit Size: Size 17  
Insulation: R-13 Double Wall Sealed Panel  
Exterior Finish: Galvanized Exterior Panels  
Interior Finish: Galvanized Interior Panels  
Level I Thermal Break  
6 inch tall Base Rail

#### **Mixing Box**

Shipping Split After  
Damper: Left Side Premium Opposed  
Damper: Top Premium Opposed

#### **Angle Filter**

Shipping Split After  
Shipping Skid  
2In. Angle Filter  
Qty (12) 12in. x 24in.  
Door Left Side

#### **Electric Heat Section**

Shipping Split After  
Factory Wired Panel Left Side  
56KW 480 Volts 3 Phase Unsheathed Element  
SCR Control

#### **Direct Expansion Coil**

Shipping Split After  
Shipping Skid  
304 Stainless Steel Drain Pan Left Side  
Direct Expansion 16.93 sq.ft 4 Row 14 FPI Face Split Half Circuit  
Coil Connection Left Side  
1/2 in. Tube Diameter  
AL fins Galv. Casing

Job Name      St Michael Archangel Church  
Mark for      AHU-2  
Date          May 30, 2014

---

No Coating

R-410A

### **Draw-Thru Supply Fan**

Rear Inlet

Fan Sled

Forward Curve B FCA18\_18A

907 fanRPM Class I

Top Horiz. Front Discharge

Left Side Fan Motor Location

Spring Fan Isolation

Motor

5 HP Premium Efficiency ODP 208-230/460 3Ph 60Hz 1800 RPM

Manufacturer - Generic

Frame Size - 184T

Motor Shaft Diameter (in.) - 1.125

Voltage Selected - 460/3/60

Full Load Amps - 6.5

MCA - 8.1

MOCP - 10

Efficiency - 89.5%

Belt Drive

1.2 Service Factor

Fixed Pitch Drive

1 or more belts

Starter

Combination Starter & Non-fused Disconnect 460 Volts 3 Phase 60Hz

Door Left Side

### **Configuration Notes**

Preheat coil configurations can cause freezstat to trip if the downstream cooling coil isn't drained in heating season and/or PID valve control loop is too slow to react.

Electric heaters must have 12" clearance upstream and downstream from field installed components.

Discharge duct(s) must be gasketed and screwed directly to the discharge panel of the unit.

### **Weights and Dimensions**

(LxWxH in ft in) 13' 9" x 7' 3" x 4' 2" \*\*

Operating 2983 LB \*\*

Weights and Dimensions are approximate. Weights include base unit weight, coils (wet & dry), fans and fan motors, and other components, but does not include filters, drives and skids. Approximate dimensions are provided primarily for shipping purposes. Shipping skids are not included.

All filter media efficiency ratings are for the filter media only.

---

SUBJECT TO CHANGE WITHOUT NOTICE



## DX Coil Performance Summary

Project: Untitled  
Tag: AHU-2

DX Cooling Application's Balance Criteria: Total Cooling

Coil Model \_\_\_\_\_  
Split Type \_\_\_\_\_  
Row / FPI / Circ \_\_\_\_\_  
Face Area Type \_\_\_\_\_  
Coil Face Area \_\_\_\_\_  
Face Velocity \_\_\_\_\_  
Fin-Casing Material \_\_\_\_\_  
Tube Diameter \_\_\_\_\_  
Tube spacing: Stf x Str \_\_\_\_\_  
Tube Wall Thickness \_\_\_\_\_  
Actual Airflow \_\_\_\_\_  
Site Altitude \_\_\_\_\_  
Total Cooling Capacity \_\_\_\_\_  
Sensible Cooling Capacity \_\_\_\_\_  
Air Friction \_\_\_\_\_

Condensing Unit 38AUD025(D) (Circuit B, Upper Connections)

Nozzle Size \_\_\_\_\_

**Note: Nozzle Factory Supplied and Installed**

Number of TXV's \_\_\_\_\_

TXV Tonnage \_\_\_\_\_

Sat. Suction Temp. \_\_\_\_\_

Sat. Cond. Temp. \_\_\_\_\_

Tons Per Circuit \_\_\_\_\_

Condensing Unit 38AUD025(D) (Circuit A, Lower Connections)

Nozzle Size \_\_\_\_\_

**Note: Nozzle Factory Supplied and Installed**

Number of TXV's \_\_\_\_\_

TXV Tonnage \_\_\_\_\_

Sat. Suction Temp. \_\_\_\_\_

Sat. Cond. Temp. \_\_\_\_\_

Tons Per Circuit \_\_\_\_\_

Condensing Ent. Air Temp \_\_\_\_\_

Suction Line Loss \_\_\_\_\_

Compressor Power \_\_\_\_\_

Vapor Superheat \_\_\_\_\_

Liquid Sub-Cooling \_\_\_\_\_

Entering Air Dry Bulb \_\_\_\_\_

Entering Air Wet Bulb \_\_\_\_\_

Entering Air Enthalpy \_\_\_\_\_

Leaving Air Dry Bulb \_\_\_\_\_

Leaving Air Wet Bulb \_\_\_\_\_

Leaving Air Enthalpy \_\_\_\_\_

Accessory PD \_\_\_\_\_

Cond vs Evap \_\_\_\_\_

Vertical Separation \_\_\_\_\_

**Carrier 28ME**  
**Face Split (Dual Circuit)**  
**4 / 14 / HF**



**Large**

**16.93** sqft

**413.5** fpm

**Al-Galv.**

**0.5** in

**1.25 x 0.781** in

**0.016** in

**7000** CFM

**0** ft

**237.08** MBH

**179.00** MBH

**0.46** in wg

**G8**

**1**

**8**

**49.2** F

**120.5** F

**1.26** Tons

**G6**

**1**

**8**

**47.0** F

**120.0** F

**1.38** Tons

**95.0** F

**2.7** F

**16.8** kW

**15.0** F

**15.0** F

**79.30** F

**65.80** F

**30.50** BTU/lb

**55.92** F

**54.69** F

**23.0** BTU/lb

**0.0** psig

**Even**

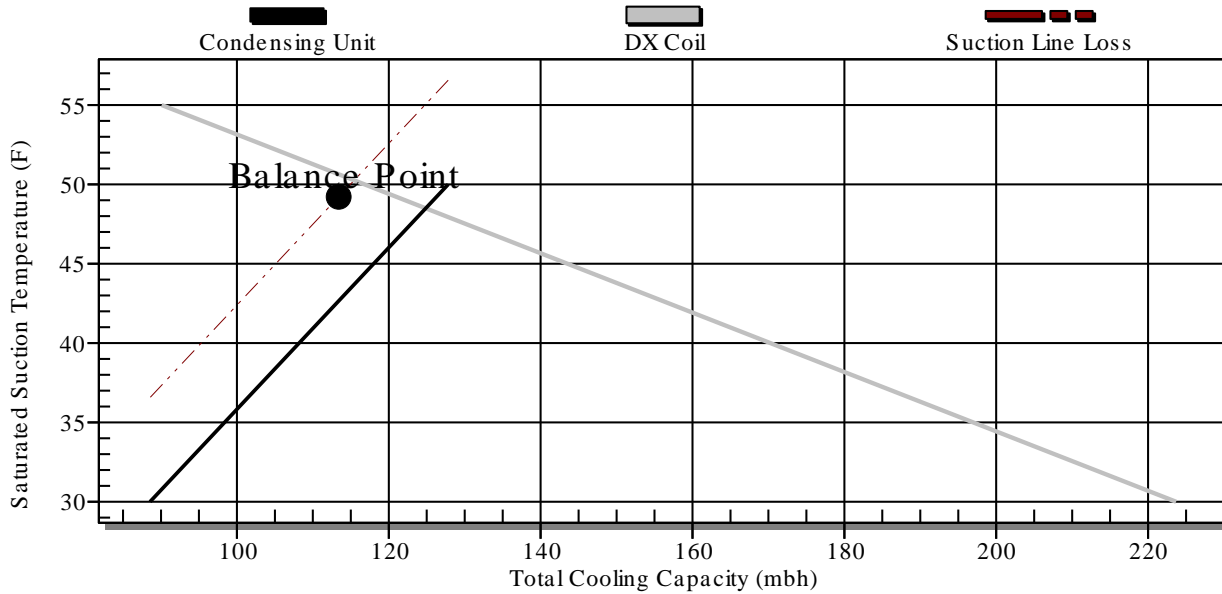
**0.0** ft

## DX Coil Performance Summary

Project: Untitled  
Tag: AHU-2

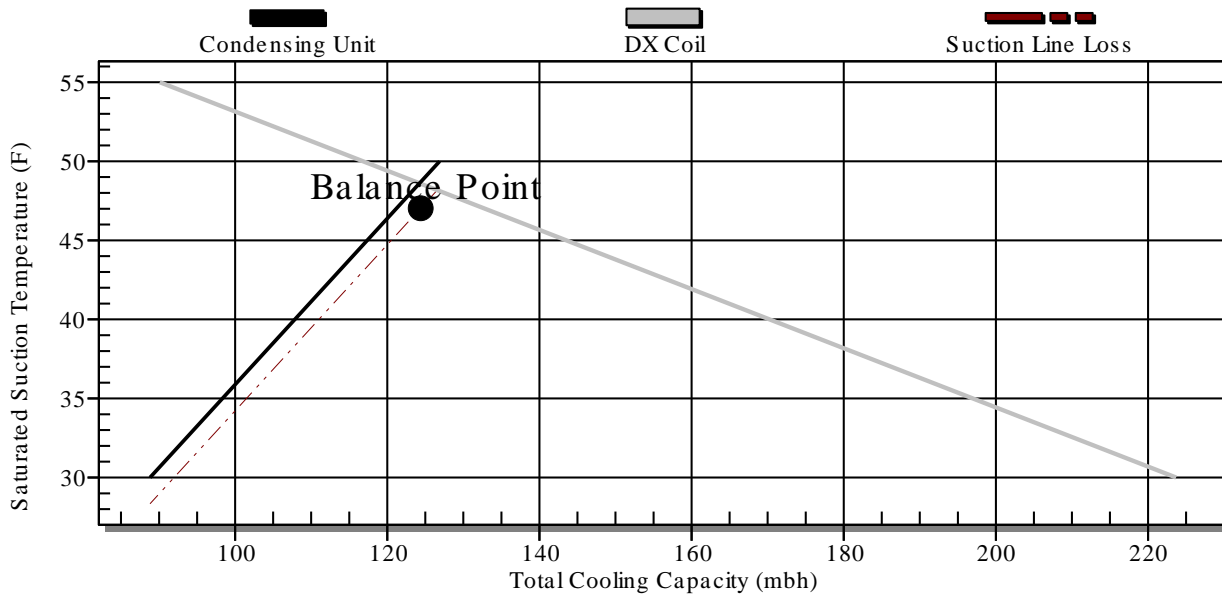
### DX Coil Cross-Plot

4 / 14 / HF 38AUD025(D) (Circuit B, Upper Connections)



### DX Coil Cross-Plot

4 / 14 / HF 38AUD025(D) (Circuit A, Lower Connections)



## Electric Heater Performance Summary

Project: Untitled  
Tag: AHU-2

Unit Size	17	
Coil Face Area	16.60	sqft
Face Velocity	421.7	fpm
Actual Airflow	7000	CFM
Minimum Airflow	5810	CFM
Altitude	0	ft
Heating Capacity	191.13	MBH
kW	56	kW
Voltage, 3 phase	480	
FLA	67	
MCA	84	
MOCP	90	
Subcircuits	2	
Ent. Air Temperature	70.00	F
Lvg. Air Temperature	94.82	F
Air Friction	0.01	in wg

# Supply Fan Performance Summary

Project: Untitled  
Tag: AHU-2

Fan Model **39M**  
Unit Size **17**  
Fan Type **FORWARD CURVED**  
Fan Wheel Diameter **18**  
Fan Class **I**  
Fan Application **Draw Thru**  
Orientation **Horizontal**  
Actual Airflow, CFM **7000**  
Site Altitude, ft **0**  
Upstream Ext. Static, in wg **0.00**  
Downstream Ext. Static, in wg **1.00**  
Cooling Coil Static, in wg **0.46**  
Heating Coil Static, in wg **0.00**  
Other Losses, in wg **0.00**  
Total Accessory Static, in wg **0.90**  
Total Static Pressure, in wg **2.36**  
Calculated Fan RPM / Motor RPM **907 / 1800**  
Class I Max. RPM **1097**  
Static Efficiency (%) **57**  
Fan BHP **4.5**

## Acoustic Data:

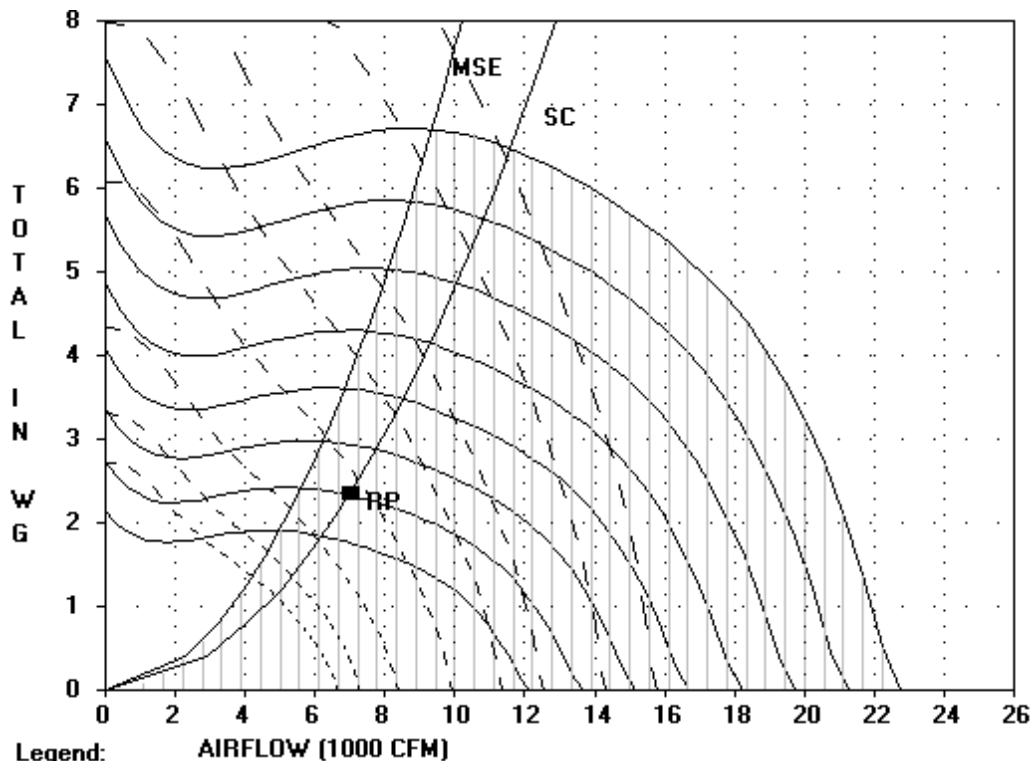
	Discharge	Inlet	Casing
63 Hz	91	83	82
125 Hz	82	75	73
250 Hz	80	65	64
500 Hz	80	64	64
1000 Hz	77	63	61
2000 Hz	73	59	57
4000 Hz	69	56	44
8000 Hz	62	46	37



Sound power levels for 39M units are rated in accordance with AHRI Standard 260.

## Accessories:

- (1) ANG Synthetic (2") MERV 13, Dirty [0.82]
- (1) Electric Heat [0.01]
- (1) Side Mixing or Exhaust Box [0.07]



Legend:

- RPM    - BHP    MSE - Max. Static Eff.    SC - System Curve    RP - Rated Point

RPM = 907    BHP = 4.5    CLASS I MAX. RPM = 1097

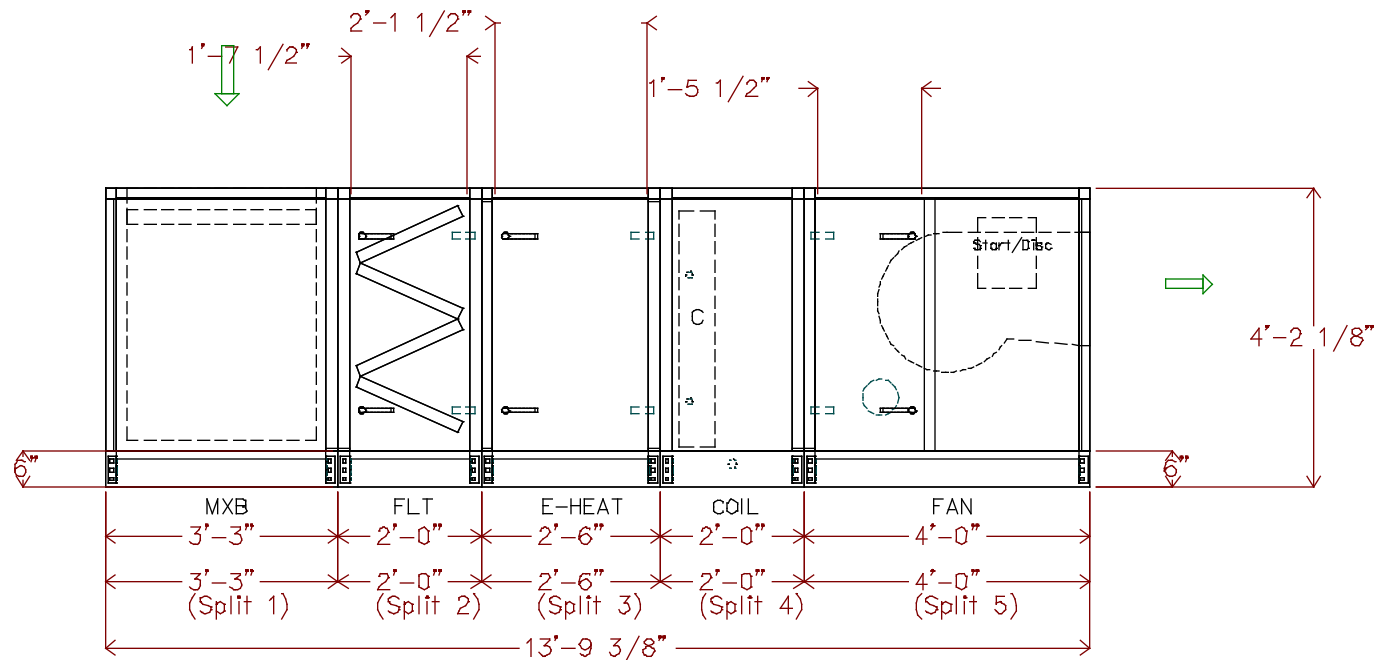
RPM's (x 100, L to R): 8 9 10 11 12 13 14 15

BHP's (L to R): 1.5 2 3 5 7.5 10 15 20

Unit width: 7'-3 9/16" (plus lifting lugs)  
 2in. Angle Filter  
 Qty (12) 12in. x 24in.  
 Direct Expansion 4 Row 14 FPI Face Split Half Circuit (qty. 1)  
 2 @ 0.875" diameter distributor(s)  
 Draw-Thru Supply Fan

5 HP Premium Efficiency ODP 208-230/460 3Ph 60Hz 1800 RPM  
 Operating weight: 2984.0 lbs.  
 Upstream Corner Weight (each): 646.0 lbs.  
 Downstream Corner Weight (each): 846.0 lbs.

Split	Airway Length	Weight (lbs.)
(Split 1)	3'-3"	473
(Split 2)	2'-0"	427
(Split 3)	2'-6"	438
(Split 4)	2'-0"	502
(Split 5)	4'-0"	1144



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39M Central Station Air-Handler, Size 17  
 St Michael Archangel Church: AHU-2  
 Assembly Drawing

REVISION  
 Side View

Unit viewed from right side of side elevation view.  
 Unit length: 13'-9 3/8"  
 2in. Angle Filter  
 Qty (12) 12in. x 24in.  
 Direct Expansion 4 Row 14 FPI Face Split Half Circuit (qty. 1)  
 2 @ 0.875" diameter distributor(s)

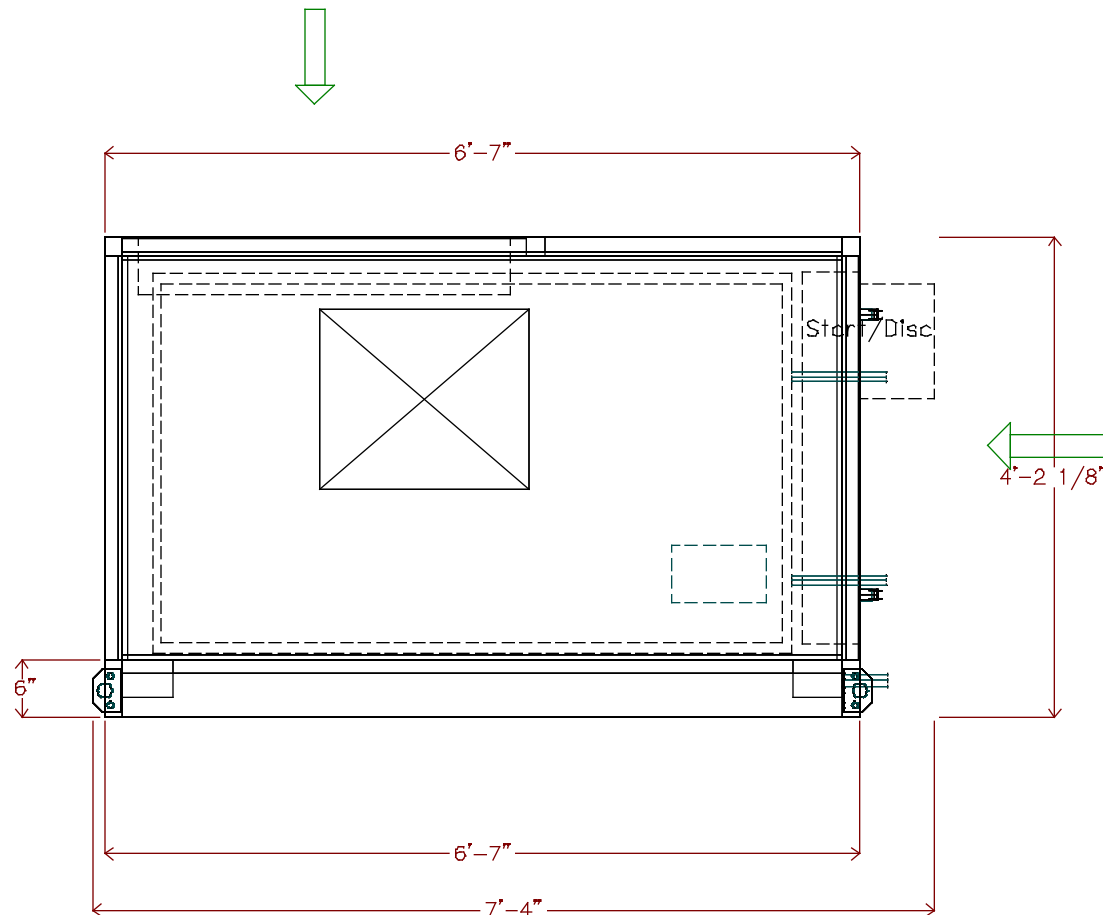
Draw-Thru Supply Fan  
 5 HP Premium Efficiency ODP 208-230/460 3Ph 60Hz 1800 RPM  
 Operating weight: 2984.0 lbs.  
 Upstream Corner Weight (each): 646.0 lbs.  
 Downstream Corner Weight (each): 846.0 lbs.



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Unit height: 4'-2 7/8"  
 2in. Angle Filter  
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 Direct Expansion 4 Row 14 FPI Face Split Half Circuit (qty. 1)  
 2 @ 0.875" diameter distributor(s)  
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5 HP Premium Efficiency ODP 208-230/460 3Ph 60Hz 1800 RPM  
 Operating weight: 2984.0 lbs.  
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 Downstream Corner Weight (each): 846.0 lbs.

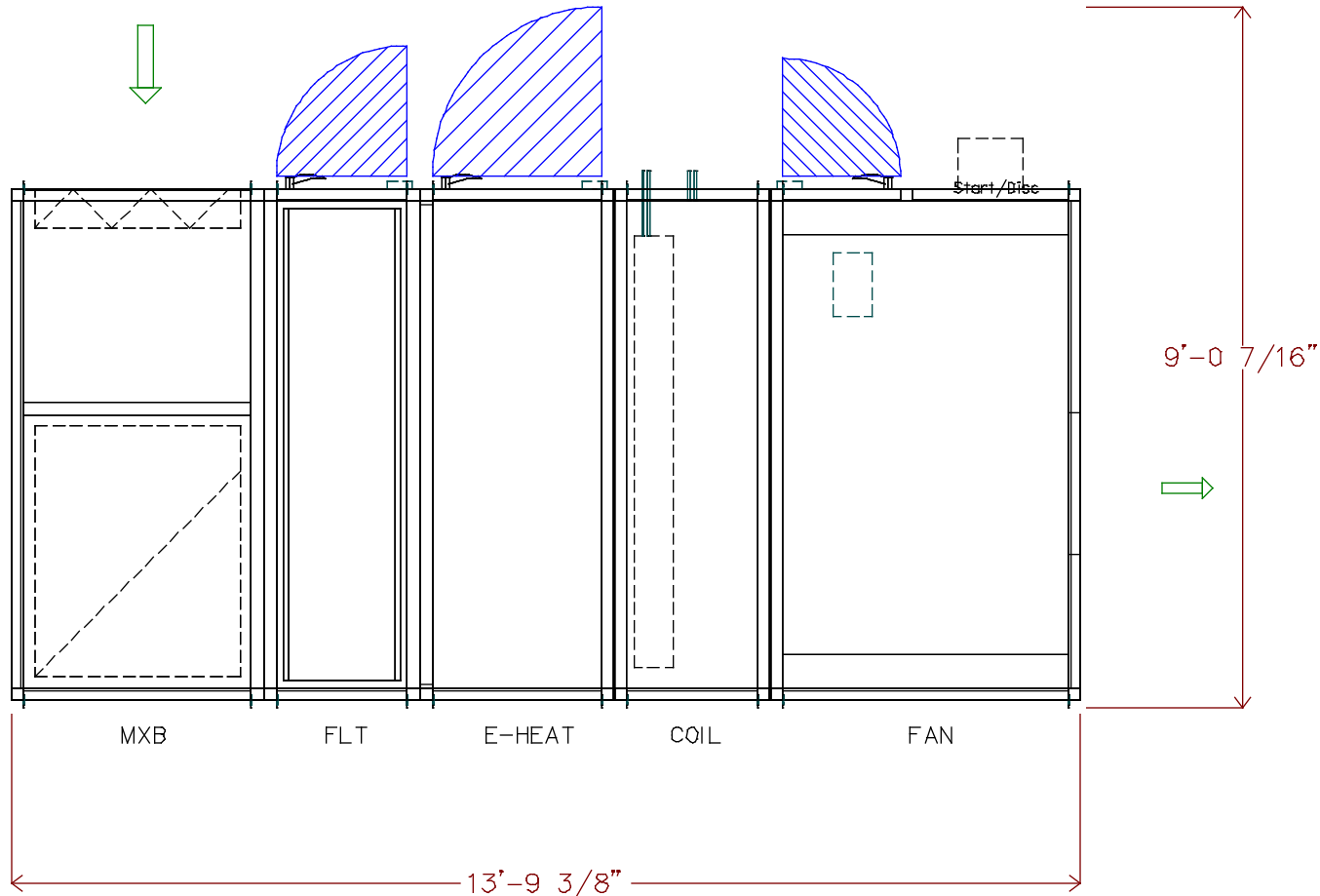


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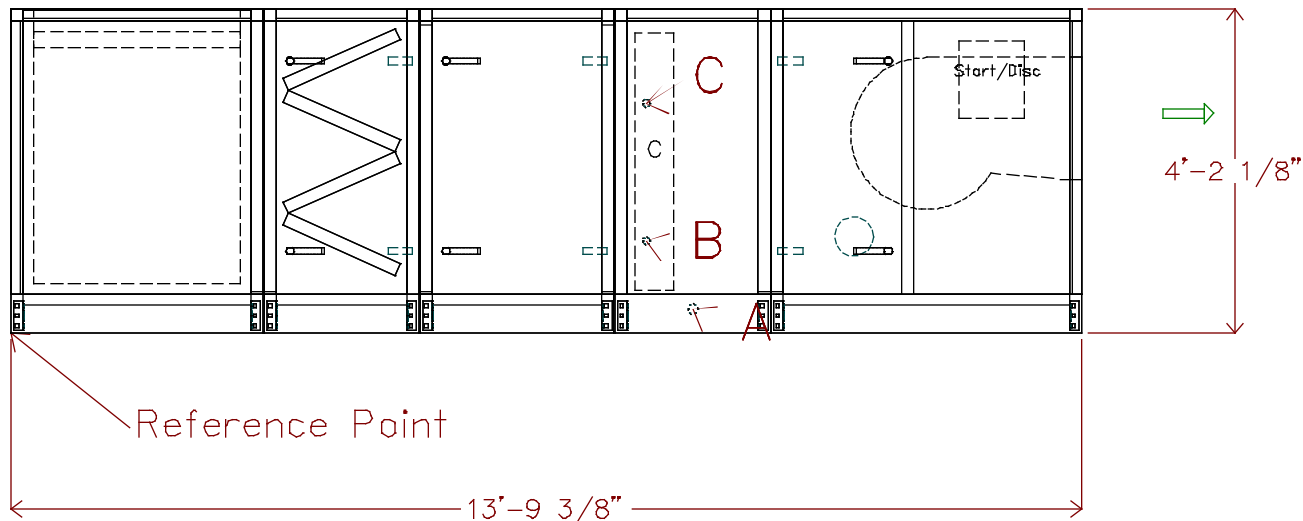
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39M Central Station Air-Handler, Size 17  
 St Michael Archangel Church: AHU-2  
 Assembly Drawing

REVISION  
 Top View

Direct Expansion 4 Row 14 FPI Face Split Half Circuit (qty. 1)  
 2 @ 0.875" diameter distributor(s)

Pipe	x	y	diameter	Usage
A	8'-9 5/16"	3 13/16"	1 1/2"	DrainPan
B	8'-2 1/8"	1'-2 1/4"	1 1/8"	Suction
C	8'-2 1/8"	2'-11 1/2"	1 1/8"	Suction



DATE  
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Configurator Ver.  
 v6.34 02/11/14

39M Central Station Air-Handler, Size 17  
 St Michael Archangel Church: AHU-2  
 Assembly Drawing

REVISION  
 Side View



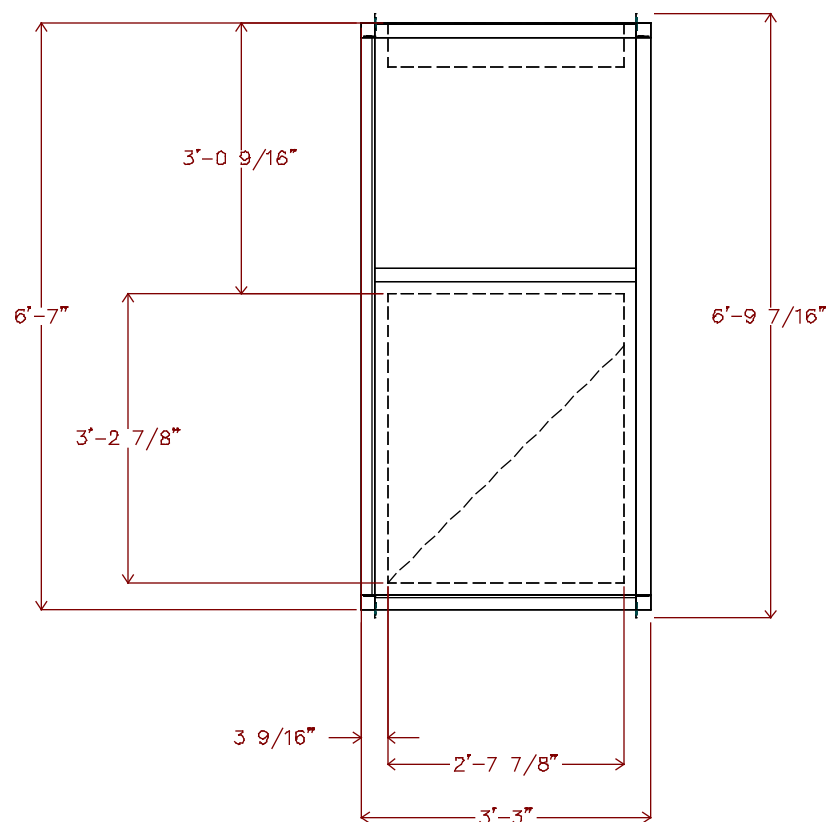


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39M Central Station Air-Handler, Size 17  
St Michael Archangel Church: AHU-2  
Mixing Box

REVISION  
Top View

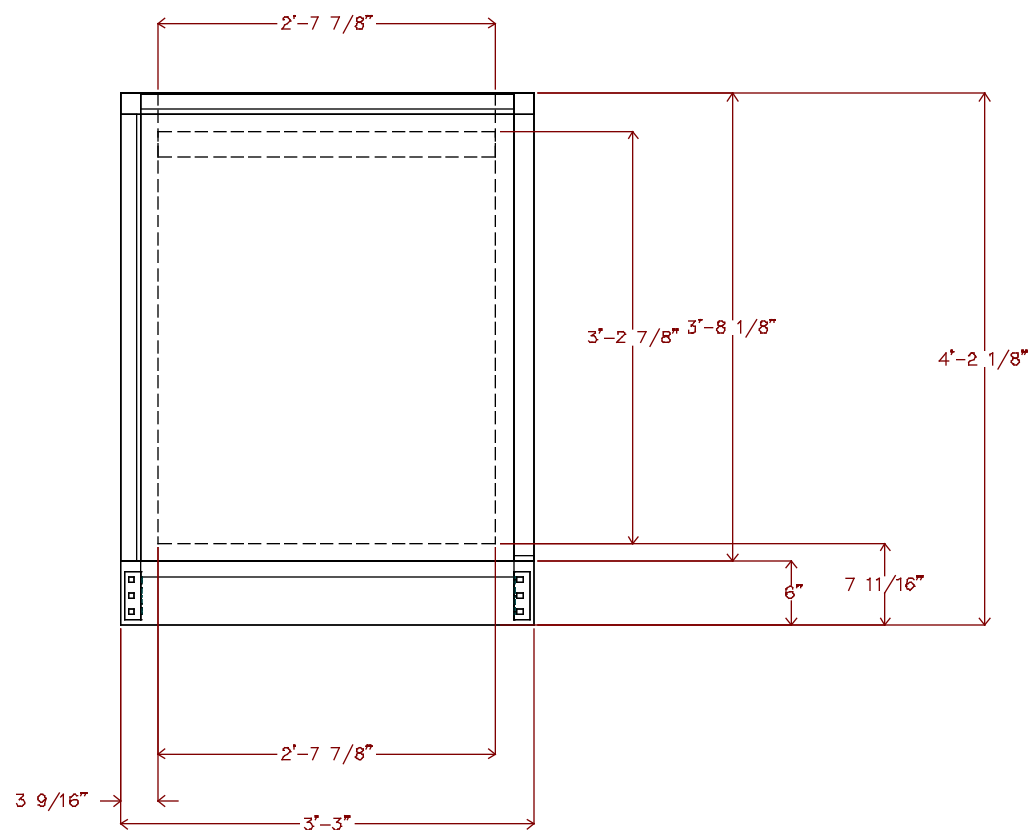


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39MN



DATE  
5/30/2014

Configurator Ver.  
v6.34 02/11/14

39M Central Station Air-Handler, Size 17  
St Michael Archangel Church: AHU-2  
Mixing Box

REVISION  
Side View



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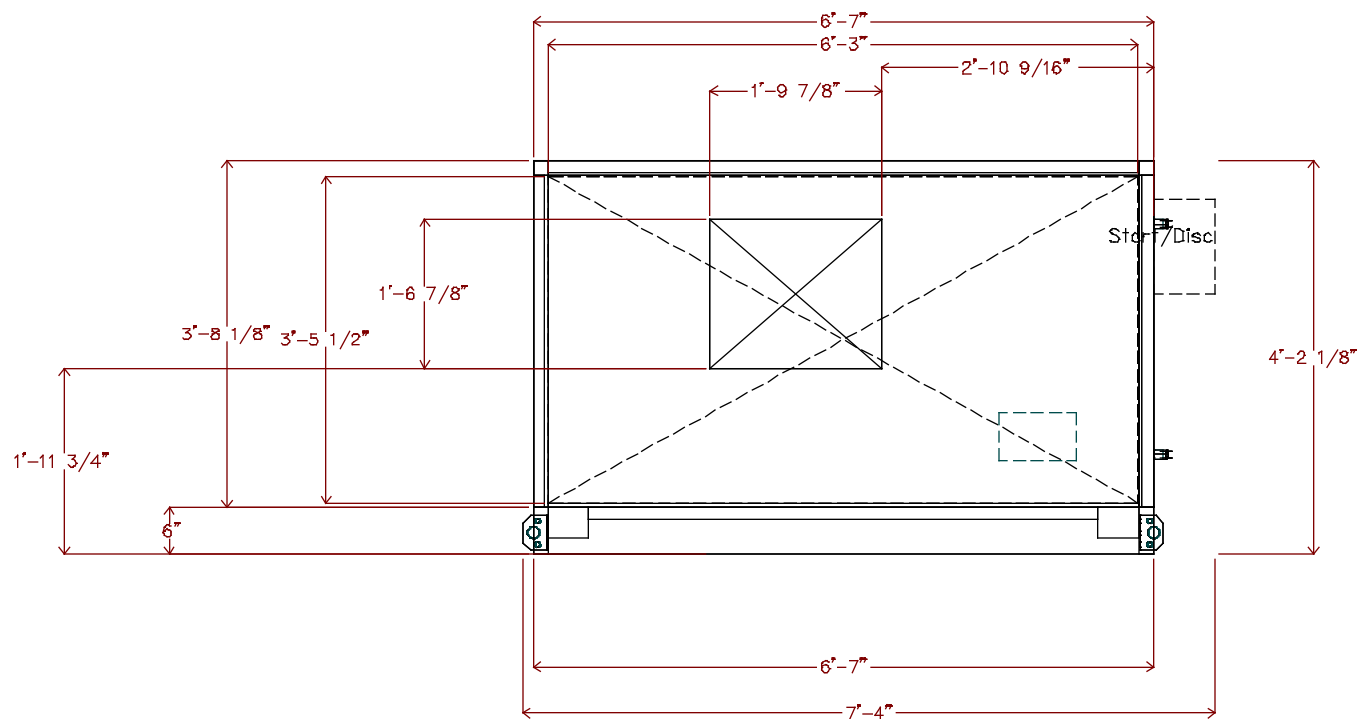
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Unit viewed from right side of side elevation view.

Draw-Thru Supply Fan

5 HP Premium Efficiency ODP 208-230/460 3Ph 60Hz 1800 RPM



DATE  
5/30/2014

Configurator Ver.  
v6.34 02/11/14

39M Central Station Air-Handler, Size 17  
St Michael Archangel Church: AHU-2  
Draw-Thru Supply Fan

REVISION  
End View

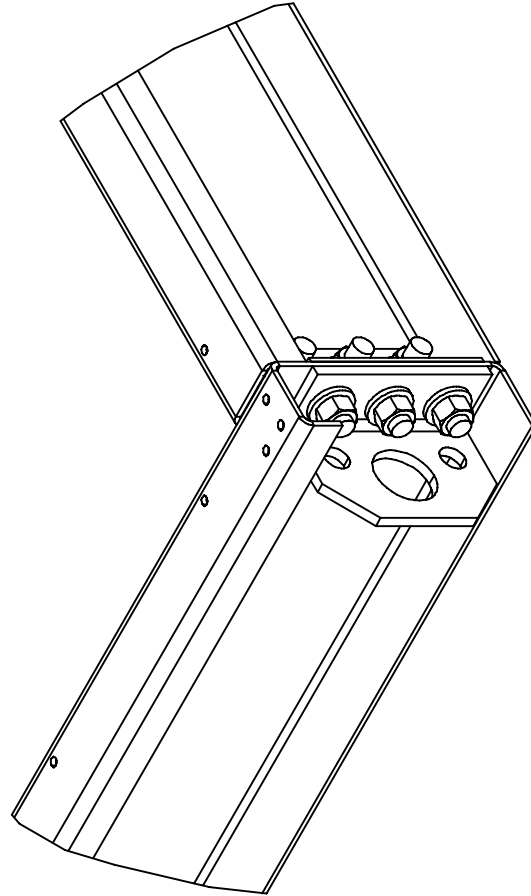
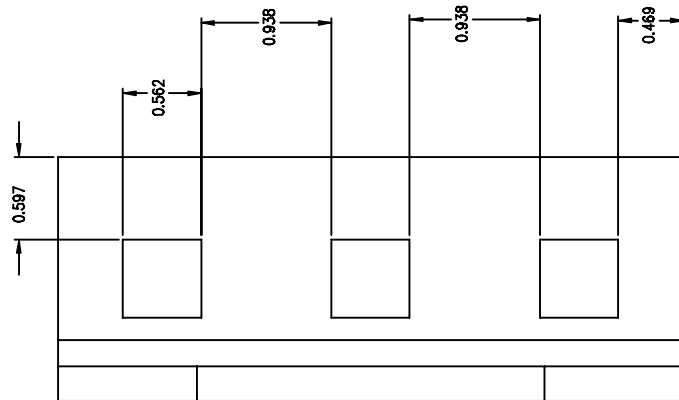
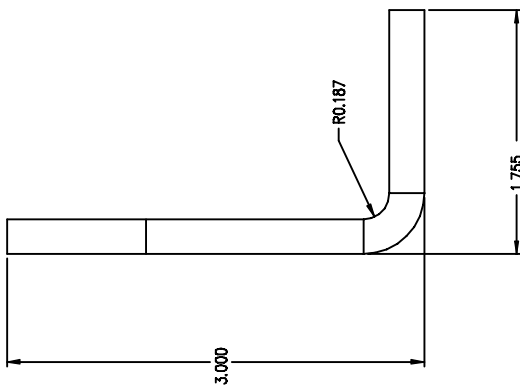
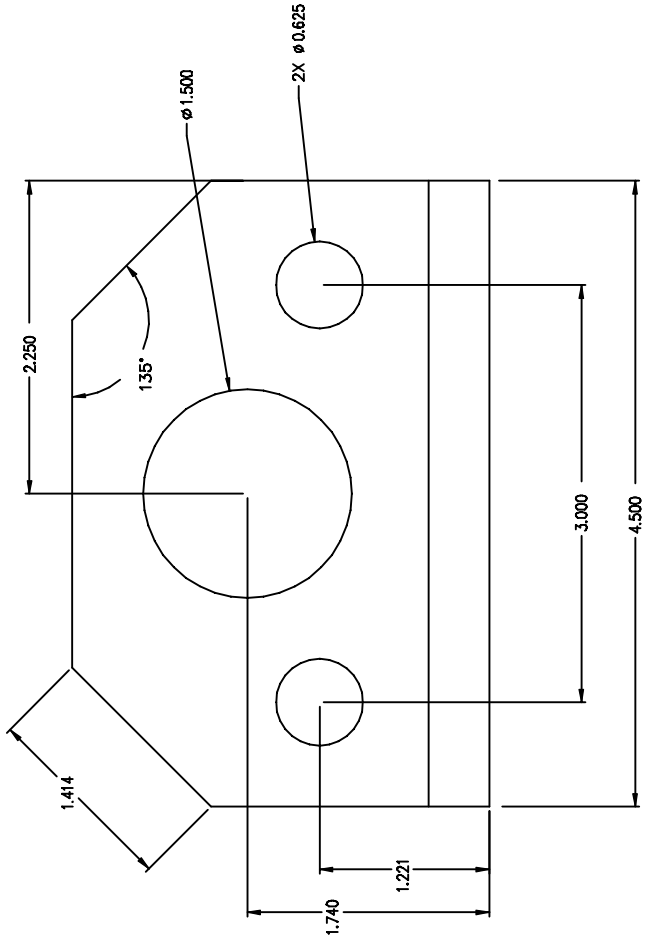


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REVISION  
39M Central Station Air-Handler, Size: 03 - 110  
6" Base rail and Lifting Lug Detail



Carrier

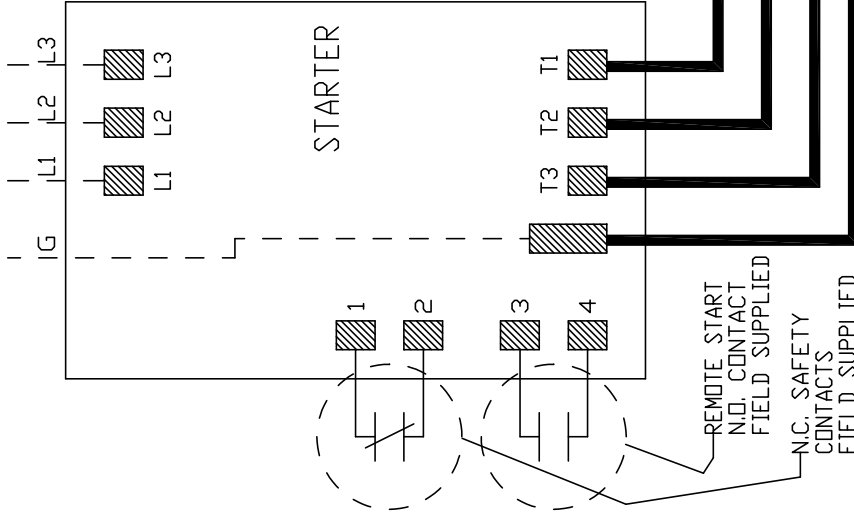
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39M

FIELD SUPPLIED WIRING  
PER "NEC" CODE



NOTES:

- 1) MOTOR CONNECTIONS L4 THRU L9 NOT SHOWN. CONNECT PER MOTOR MANUFACTURERS RECOMMENDATIONS AND SPECIFIED OPERATING VOLTAGE.
- 2) CHECK FOR CORRECT MOTOR ROTATION AFTER WIRING. TO REVERSE MOTOR ROTATION, REVERSE FIELD LINE VOLTAGE WIRING ON TERMINALS L1 AND L2.
- 3) REMOVE FACTORY INSTALLED JUMPER WIRE BETWEEN TERMINALS 1 AND 2 BEFORE CONNECTING SAFETY CONTACT (LTT/HPS).
- 4) FIELD WIRING MUST BE IN ACCORDANCE WITH "NEC" CODE AND LOCAL CODE REQUIREMENTS. REFER TO INSTALLATION INSTRUCTION FOR MINIMUM WIRE GAUGE REQUIREMENTS.
- 5) ALL FACTORY WIRING IS RATED FOR 90 DEGREES C, TYPE THHN. REPLACE WITH SAME SIZE AND TYPE AS ORIGINALLY SUPPLIED.

39MA51003756 -

39M Central Station Air-Handler, Size: 03 - 61  
Three Phase Starter Wiring Detail

REVISION

## Air Filter Submittal

Project: Untitled  
Unit Tag: AHU-2

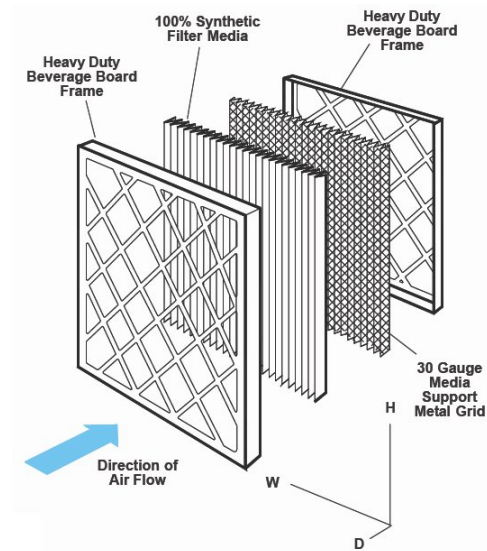
Carrier Part Number .....	31KFG39MD017822
Kit Description .....	Filter Kit, 2" ANG/FMB Pleated (MERV13), 39M017
Unit Airflow, CFM .....	7000
Filter Velocity, FPM .....	292
Filter Sizes and Quantities .....	Qty (12) 12in. x 24in.

## Quality Pleat

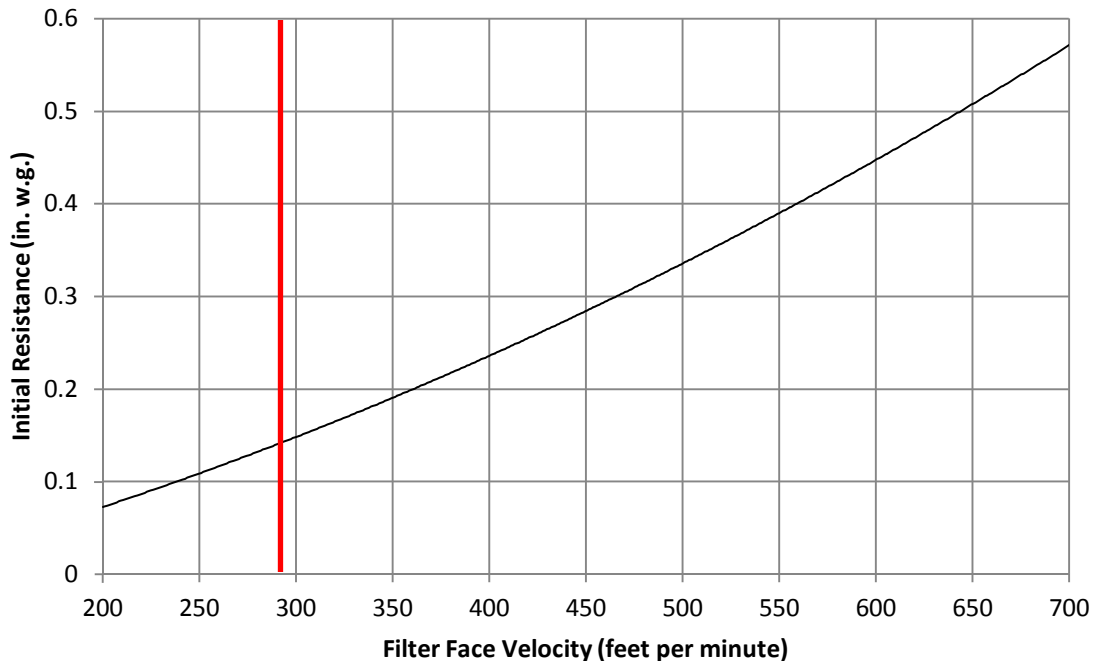
### MERV 13 Pleated Filter

The 100% synthetic graduated density media is continuously bonded to a 30 gauge galvanized, corrosion resistant, expanded metal support grid with an effective open area of 96%. The media is resistant to a wide range of chemicals, does not absorb moisture and will not support microbial growth.

The controlled pleat spacing maximizes surface area and dust holding capacity and is bonded to the enclosure frame to prevent dust bypass. The enclosure frame is constructed of high wet strength moisture resistant beverage board. The diagonal support members of the frame are bonded to the entering and exiting apexes of each pleat to prevent pleat collapse and filter bowing.



### Filter Pleated (2") MERV 13



## Unit Report For CU-1,2

Project: ~Untitled65  
Prepared By:

05/30/2014  
03:47PM



### Outdoor Unit Parameters

Unit Quantity:.....1  
Unit Model:.....38AUD  
Unit Size:.....20 Tons  
Voltage:.....460-3-60 V-Ph-Hz  
Condenser Coil:.....Al/Cu

### System Parameter

System Quantity:.....2  
Refrigerant Type:.....PURON  
Compressor Quantity:.....2  
Compressor Type:.....Scroll  
Std. Capacity Steps:.....50, 100  
Std. Min. Outdoor Temp(Cooling):.....-20.0 °F  
No. of Outdoor fans:.....4

### Outdoor Unit Dimensions and Weight

Unit Length:.....7' 2.1"  
Unit Width:.....5' 7.1"  
Unit Height:.....4' 2.4"  
Unit Shipping Weight:.....978 lb  
Unit Operating Weight:.....900 lb

### Accessories and Installed Options

Low ambient FIOP operation down to -20 F.

### Warranty Information (Note: for US & Canada only)

**NOTE:** Please see Warranty Catalog 808-218 for explanation of policies and ordering methods.

### Ordering Information

Part Number	Description	Quantity
<b>Base Unit - Outdoor</b>		
38AUDB25A0A6-0A0A0		2
	Base Unit	
	Al/Cu Condensing Coil	2
	Low Ambient Controls Refrigerant Options	2
	Service Options - None	2
	Electrical Options - None	2
	Packaging Options - Standard	2
	Standard Electrical Mechanical Controls	2
<b>Accessories</b>		
CALVHLGD009A00	Louvered Condenser Coil Hail Guard for Outdoor Unit	2
KM680004	Sight Glass for Outdoor Unit	4
EF680035	Liquid Line Solenoid Valve for Outdoor Unit	4
EF680037	Liquid Line Solenoid Valve for Outdoor Unit	4

## Performance Summary For CU-1,2

Project: ~Untitled65  
Prepared By:

05/30/2014  
03:47PM

**System:** ..... 38AUD025  
**System Quantity:** ..... 2  
**Altitude:** ..... 0.0 ft  
**EER @ ARI Conditions:** ..... 13.0  
**IPLV:** ..... NA  
**Suction Line Loss:** ..... 1.4 °F  
 Condensing unit is rated in accordance with ARI 365.

### Liquid and Suction Line Sizing

Pipe Length	Liquid Line Size	Suction Line Size
0 - 25	1/2	1 1/8
26 - 50	1/2	1 1/8
51 - 75	1/2	1 1/8
76 - 100	1/2	1 1/8
101 - 125	1/2	1 3/8

### Outdoor Unit Parameters

**Unit Quantity:** ..... 1  
**PartNumber:** ..... 38AUDB25A0A6-0A0A0  
**Unit Model:** ..... 38AUD  
**Unit Size:** ..... 20 Tons  
**Condenser Coil:** ..... Al/Cu  
**Voltage:** ..... 460-3-60 V-Ph-Hz  
**Total Clg Cap.(Gross):** ..... 242.3 MBH  
**SDT:** ..... 119.2 °F  
**Clg Ent Air DB:** ..... 95.0 °F  
**Saturated Suction Temp:** ..... 45.0 °F

### Outdoor Electrical Data

**Unit Voltage:** ..... 460-3-60 V-Ph-Hz  
**Unit#1 MCA:** ..... 40.8 Amps  
**Unit#1 MOCP:** ..... 50.0 Amps  
**Total Compressor Power of Unit #1:** ..... 16.70 kW  
**Voltage Range Min:** ..... 414 V  
**Voltage Range Max:** ..... 506 V  
**Compressor RLA:** ..... 16.7  
**Compressor LRA:** ..... 114  
**Compressor Quantity:** ..... 2  
**Fan Motors Qty:** ..... 4

Notice: Outdoor unit elect. data is based on 460-3-60  
 Control Panel SCCR: 5kA RMS at Rated Symmetrical Voltage

### Acoustics

Sound Power Levels, db re 10E-12 Watts

	Outdoor Unit (dB)	Indoor Unit (dB,Ducted)
A-Weighted Total Level	85.2	NA
63Hz	91.0	NA
125Hz	85.0	NA
250Hz	80.0	NA
500Hz	86.0	NA
1000Hz	79.0	NA
2000Hz	73.0	NA
4000Hz	68.0	NA
8000Hz	63.0	NA
Sound Message	Sound for AUD025	



## Performance Summary For CU-1,2

Project: ~Untitled65  
Prepared By:

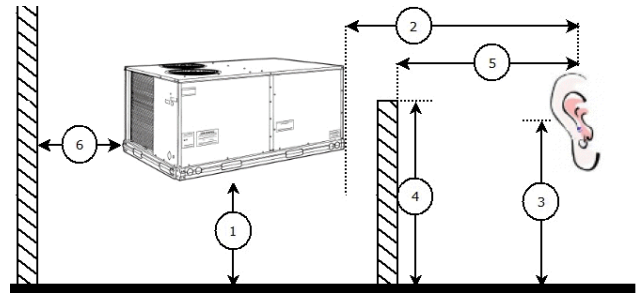
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### Acoustic Note:

1. 38AUZ and 38AUD sound power data is tested in accordance with ARI270-95 Sound Rating of Unitary Equipment.
2. The indoor duct sound power data is estimated based on the ASHRAE calculation approach from the ASHRAE handbook 1987 HVAC Systems & Applications, Chapter 52.
3. The acoustic center of the unit is located at the geometric center of the unit.
4. All estimated sound power levels, dB re 1 Picowatt should not be guaranteed or certified as being the actual sound power levels.

### Advanced Acoustics Parameters

1. Unit height above ground:..... **1.0** ft
2. Horizontal distance from unit to receiver:..... **20.0** ft
3. Receiver height above ground:..... **5.7** ft
4. Height of obstruction:..... **0.0** ft
5. Horizontal dist. from obstruction to receiver:..... **0.0** ft
6. Horizontal dist. from unit to obstruction:..... **0.0** ft



### Detailed Acoustics Information

Octave Band Center Frequency, Hz	63	125	250	500	1k	2k	4k	8k	Overall
Sound Power Levels at Unit's Acoustic Center (Lw), dB	91.0	85.0	80.0	86.0	79.0	73.0	68.0	63.0	93.4
A-Wgtd Sound Power Levels at Unit's Acoustic Center (LwA), dBA	64.8	68.9	71.4	82.8	79.0	74.2	69.0	61.9	85.2
Sound Press. Levels at Dist. Specified above (Lp), dB	66.3	60.3	55.3	61.3	54.3	48.3	43.3	38.3	68.7
A-Wgtd Sound Press. Levels at Dist. Specified above (LpA), dBA	40.1	44.2	46.7	58.1	54.3	49.5	44.3	37.2	60.5

Calculation methods used in this program are patterned after the ASHRAE Guide; other ASHRAE Publications and the AHRI Acoustical Standards. While a very significant effort has been made to insure the technical accuracy of this program, it is assumed that the user is knowledgeable in the art of system sound estimation and is aware of the tolerances involved in real world acoustical estimation. This program makes certain assumptions as to the dominant sound sources and sound paths which may not always be appropriate to the real system being estimated. Because of this, no assurances can be offered that this software will always generate an accurate sound prediction from user supplied input data. If in doubt about the estimation of expected sound levels in a space, an Acoustical Engineer or a person with sound prediction expertise should be consulted.

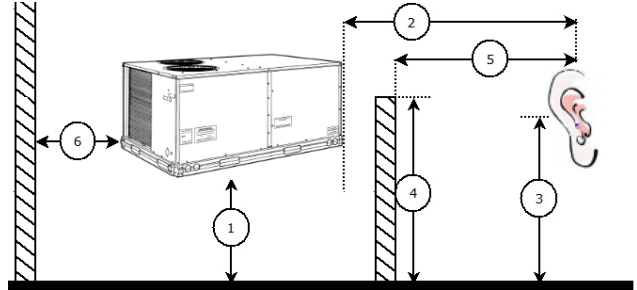
## Acoustic Summary For CU-1,2

Project: ~Untitled65  
Prepared By:

05/30/2014  
03:47PM

### Outdoor Unit Parameters:

Tag Name:..... **CU-1,2**  
Unit Model:..... **38AUD**  
Unit Size:..... **20 Tons**  
System Type:..... **Dx Cooling Only**  
Refrigerant Type:..... **PURON**  
Compressor Quantity:..... **2**  
Compressor Type:..... **Scroll**



### Advanced Acoustics Parameters

1. Unit height above ground:..... **1.0** ft  
2. Horizontal distance from unit to receiver:..... **20.0** ft  
3. Receiver height above ground:..... **5.7** ft  
4. Height of obstruction:..... **0.0** ft  
5. Horizontal distance from obstruction to receiver:..... **0.0** ft  
6. Horizontal distance from unit to obstruction:..... **0.0** ft

### Detailed Acoustics Information

Octave Band Center Frequency, Hz	63	125	250	500	1k	2k	4k	8k	Overall
Sound Power Levels at Unit's Acoustic Center (Lw), dB	91.0	85.0	80.0	86.0	79.0	73.0	68.0	63.0	93.4
A-Wgtd Sound Power Levels at Unit's Acoustic Center (LwA), dBA	64.8	68.9	71.4	82.8	79.0	74.2	69.0	61.9	85.2
Sound Press. Levels at Dist. Specified above (Lp), dB	66.3	60.3	55.3	61.3	54.3	48.3	43.3	38.3	68.7
A-Wgtd Sound Press. Levels at Dist. Specified above (LpA), dBA	40.1	44.2	46.7	58.1	54.3	49.5	44.3	37.2	60.5

Calculation methods used in this program are patterned after the ASHRAE Guide; other ASHRAE Publications and the AHRI Acoustical Standards. While a very significant effort has been made to insure the technical accuracy of this program, it is assumed that the user is knowledgeable in the art of system sound estimation and is aware of the tolerances involved in real world acoustical estimation. This program makes certain assumptions as to the dominant sound sources and sound paths which may not always be appropriate to the real system being estimated. Because of this, no assurances can be offered that this software will always generate an accurate sound prediction from user supplied input data. If in doubt about the estimation of expected sound levels in a space, an Acoustical Engineer or a person with sound prediction expertise should be consulted.

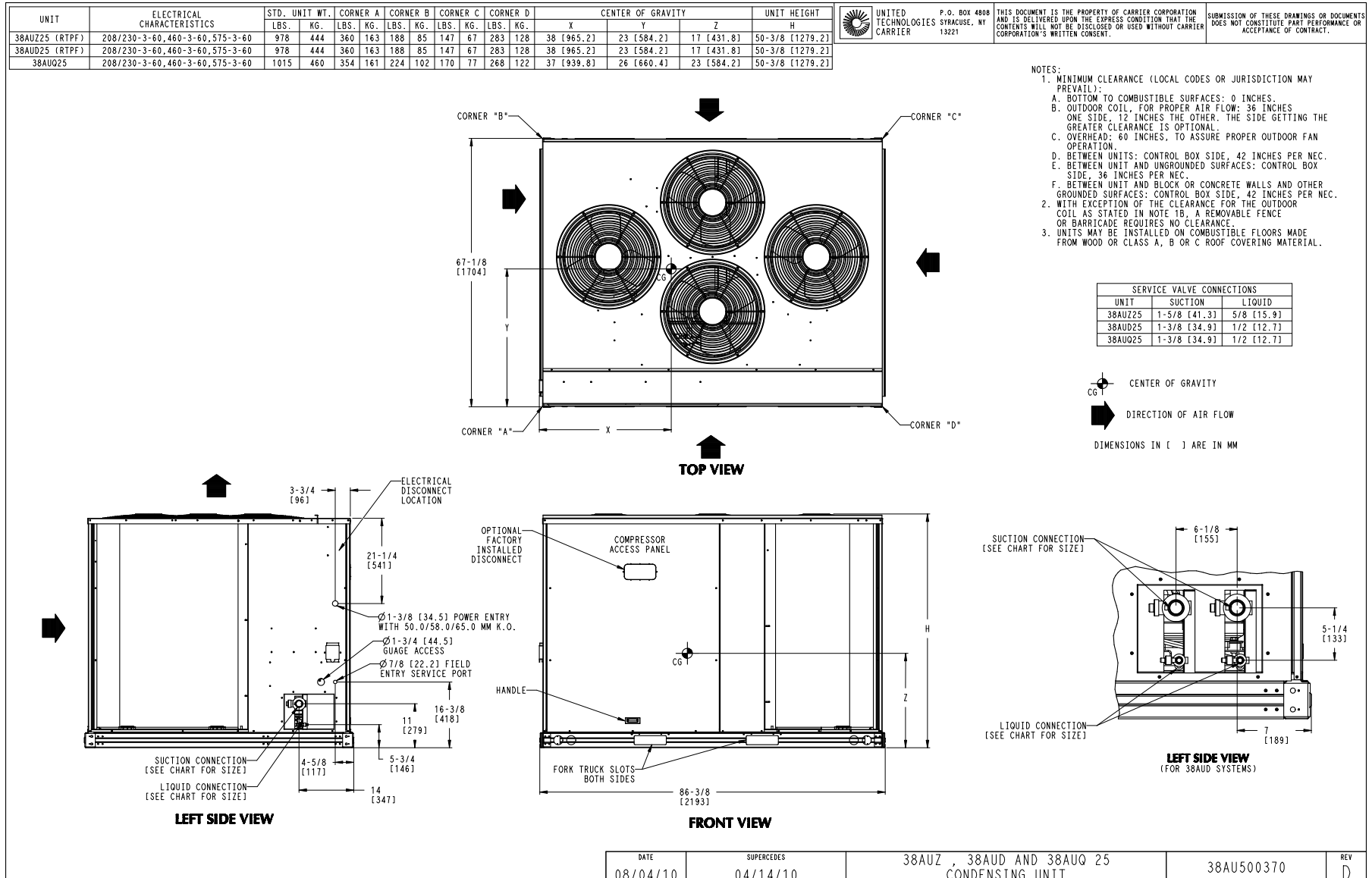
### Acoustic Note:

- 38ARZ, 38ARS and 38ARD012 sound power data is tested in accordance with ARI270-95 Sound Rating of Unitary Equipment.
- 38ARD014-024 and 38AKS data is estimated sound power levels. It is based upon a limited amount of actual testing with the estimated sound power data being generated from this data in accordance with ARI Standard 370 for large outdoor refrigerating and air-conditioning equipment.
- The indoor duct sound power data is estimated based on the ASHRAE calculation approach from the ASHRAE handbook 1987 HVAC Systems & Applications, Chapter 52.
- The acoustic center of the unit is located at the geometric center of the unit.
- All estimated sound power levels, dB re 1 Picowatt should not be guaranteed or certified as being the actual sound power levels.

# Certified Drawing for CU-1,2

Project: ~Untitled65  
Prepared By:

05/30/2014  
03:47PM



## GUIDE SPECIFICATIONS

### Commercial Air-Cooled Condensing Units

#### HVAC Guide Specifications

Size Range: **6 to 20 Tons, Nominal**

Carrier Model Numbers: **38AUZ, Single Circuit (07 - 25 Models) 38AUD, Dual Circuit (12 - 25 Models)**

#### Part 1 — General

##### 1.01 SYSTEM DESCRIPTION

Outdoor-mounted, air-cooled condensing unit suitable for on-the-ground or rooftop installation. Unit shall consist of a hermetic scroll air-conditioning compressor(s) assembly, an air-cooled coil, propeller-type condenser fans, and a control box. Unit shall discharge supply air upward as shown on contract drawings. Unit shall be used in a refrigeration circuit matched with a packaged air-handling unit.

##### 1.02 QUALITY ASSURANCE

- A. Unit shall be rated in accordance with AHRI Standard 360.
- B. Unit construction shall comply with ANSI/ASHRAE 15 safety code latest revision and comply with NEC.
- C. Unit shall be constructed in accordance with UL 1995 standard and shall carry the UL and UL, Canada label.
- D. Unit cabinet shall be capable of withstanding 500-hour salt spray exposure per ASTM B117 (scribed specimen).
- E. Air-cooled condenser coils for hermetic scroll compressor units (38AUZ) and 38AUD shall be leak tested at 150 psig, and pressure tested at 650 psig.
- F. Unit shall be manufactured in a facility registered to ISO 9001:2000 manufacturing quality standard.

##### 1.03 DELIVERY, STORAGE, AND HANDLING

Unit shall be shipped as single package only, and shall be stored and handled according to unit manufacturer's recommendations.

##### 1.04 WARRANTY (FOR INCLUSION BY SPECIFYING ENGINEER.)

#### Part 2 — Products

##### 2.01 EQUIPMENT

###### A. General:

Factory-assembled, single piece, air-cooled condensing unit. Contained within the unit enclosure shall be all factory wiring, piping, controls, compressor, holding charge, and special features required prior to field start-up.

###### B. Unit Cabinet:

- 1. Unit cabinet shall be constructed of galvanized steel, bonderized and coated with a prepainted baked enamel finish.
- 2. A heavy-gauge roll-formed perimeter base rail with forklift slots and lifting holes shall be provided to facilitate rigging.

###### C. Condenser Fans:

- 1. Condenser fans shall be direct driven, propeller type, discharging air vertically upward.
- 2. Fan blades shall be balanced.
- 3. Condenser fan discharge openings shall be equipped with PVC-coated steel wire safety guards.
- 4. Condenser fan and motor shaft shall be corrosion resistant.

###### D. Compressor:

- 1. Compressor shall be of the hermetic scroll type .
- 2. Compressor shall be mounted on rubber grommets.
- 3. Compressors shall include overload protection.
- 4. Compressors shall be equipped with a crankcase heater.
- 5. Compressor shall be equipped with internal high pressure and high temperature protection.
- 6. 38AUZ\*16 and 25 sizes shall use two scroll compressors manifold together.

###### E. Condenser Coils:

- 1. Standard Aluminum fin - Copper Tube Coils:

- a. Standard evaporator and condenser coils shall have aluminum lanced plate fins mechanically bonded to seamless internally grooved copper tubes with all joints brazed.
- b. Evaporator coils shall be leak tested to 150 psig, pressure tested to 450 psig, and qualified to UL 1995 burst test at 1775 psig.
- c. Condenser coils shall be leak tested to 150 psig, pressure tested to 650 psig, and qualified to UL 1995 burst test at 1980 psig.
2. Optional Pre-coated aluminum-fin condenser coils:
  - a. Shall have a durable epoxy-phenolic coating to provide protection in mildly corrosive coastal environments.
  - b. Coating shall be applied to the aluminum fin stock prior to the fin stamping process to create an inert barrier between the aluminum fin and copper tube.
  - c. Epoxy-phenolic barrier shall minimize galvanic action between dissimilar metals.
3. Optional Copper-fin evaporator and condenser coils:
  - a. Shall be constructed of copper fins mechanically bonded to copper tubes and copper tube sheets.
  - b. Galvanized steel tube sheets shall not be acceptable.
  - c. A polymer strip shall prevent coil assembly from contacting the sheet metal coil pan to minimize potential for galvanic corrosion between coil and pan.
4. Optional E-coated aluminum-fin evaporator and condenser coils:
  - a. Shall have a flexible epoxy polymer coating uniformly applied to all coil surface areas without material bridging between fins.
  - b. Coating process shall ensure complete coil encapsulation of tubes, fins and headers.
  - c. Color shall be high gloss black with gloss per ASTM D523-89.
  - d. Uniform dry film thickness from 0.8 to 1.2 mil on all surface areas including fin edges.
  - e. Superior hardness characteristics of 2H per ASTM D3363-92A and cross-hatch adhesion of 4B-5B per ASTM D3359-93.
  - f. Impact resistance shall be up to 160 in.-lb (ASTM D2794-93).
  - g. Humidity and water immersion resistance shall be up to minimum 1000 and 250 hours respectively (ASTM D2247-92 and ASTM D870-92).
  - h. Corrosion durability shall be confirmed through testing to be no less than 1000 hours salt spray per ASTM B117-90.
5. Standard All Aluminum Novation Coils:
  - a. Standard condenser coils shall have all aluminum Novation Heat Exchanger Technology design consisting of aluminum multi port flat tube design and aluminum fin. Coils shall be a furnace brazed design and contain epoxy lined shrink wrap on all aluminum to copper connections.
  - b. Condenser coils shall be leak tested to 150 psig, pressure tested to 650 psig, and qualified to UL 1995 burst test at 1980 psig.
6. Optional E-coated aluminum-fin, aluminum tube condenser coils:
  - a. Shall have a flexible epoxy polymer coating uniformly applied to all coil external surface areas without material bridging between fins or louvers.
  - b. Coating process shall ensure complete coil encapsulation, including all exposed fin edges.
  - c. E-coat thickness of 0.8 to 1.2 mil with top coat having a uniform dry film thickness from 1.0 to 2.0 mil on all external coil surface areas, including fin edges, shall be provided.
  - d. Shall have superior hardness characteristics of 2H per ASTM D3363-00 and cross-hatch adhesion of 4B-5B per ASTM D3359-02.
  - e. Shall have superior impact resistance with no cracking, chipping or peeling per NSF/ANSI 51-2002 Method 10.2.

#### F. Refrigeration Components:

Refrigeration circuit components shall include liquid line service valve, suction line service valve, a full charge of compressor oil, and a partial holding charge of refrigerant.

## Guide Specification for CU-1,2

Project: ~Untitled65  
Prepared By:

05/30/2014  
03:47PM

### G. Controls and Safeties:

#### 1. Minimum control functions shall include:

- a. Control wire terminal blocks.
- b. Compressor lockout on auto-reset safety until reset from thermostat.
- c. Each unit shall utilize the Comfort Alert Diagnostic Board that provides:
  - (1.) System Pressure Trip fault code indication
  - (2.) Short Cycling fault code indication
  - (3.) Locked Rotor fault code indication
  - (4.) Open Circuit fault code indication
  - (5.) Reverse Phase 3 fault code indication
  - (6.) Welded Contactor fault code indication
  - (7.) Low Voltage fault code indication
  - (8.) Anti-short cycle protection
  - (9.) Phase reversal protection

#### 2. Minimum safety devices which are equipped with automatic reset (after resetting first at thermostat), shall include:

- a. High discharge pressure cutout.
- b. Low pressure cutout.

### H. Operating Characteristics:

1. The capacity of the condensing unit shall meet or exceed \_\_\_\_\_ Btuh at a suction temperature of \_\_\_\_\_°F. The power consumption at full load shall not exceed \_\_\_\_\_ kW.
2. The combination of the condensing unit and the evaporator or fan coil unit shall have a total net cooling capacity of \_\_\_\_\_ Btuh or greater at conditions of \_\_\_\_\_ cfm entering-air temperature at the evaporator at \_\_\_\_\_°F wet bulb and \_\_\_\_\_°F dry bulb, and air entering the condensing unit at \_\_\_\_\_°F.
3. The system shall have an EER of \_\_\_\_\_ Btuh/Watt or greater at standard AHRI conditions.
4. Standard unit shall be capable to operate up to 125°F (52°C) and down to 40°F (4°C)

### I. Electrical Requirements:

1. Nominal unit electrical characteristics shall be \_\_\_\_\_ v, 3-ph, 60 Hz. The unit shall be capable of satisfactory operation within voltage limits of \_\_\_\_\_ v to \_\_\_\_\_ v.
2. Unit electrical power shall be single-point connection.
3. Unit control circuit shall contain a 24-v transformer for unit control.

### J. Special Features:

1. **Low-Ambient Temperature Control:**  
A low-ambient temperature control shall be available as a factory-installed option or as a field-installed accessory. This low-ambient control shall regulate speed of the condenser-fan motors in response to the saturated condensing temperature of the unit. The control shall maintain correct condensing pressure at outdoor temperatures down to -20°F (-29°C).

2. **Unit-Mounted, Non-Fused Disconnect Switch:**  
Switch shall be factory-installed and internally mounted. NEC and UL-approved non-fused switch shall provide unit power shutoff. Switch shall be accessible from outside the unit and shall provide power off lockout capability. Non-fused disconnect switch cannot be used when unit MOCP electrical rating exceeds 80 amps.

3. **Convenience Outlet:**  
Outlet shall be factory-installed and internally mounted with easily accessible 115-v female receptacle. Outlet shall include 15 amp GFI (ground fault interrupter) receptacle with independent fuse protection. Voltage required to operate convenience outlet shall be provided by a factory-installed step-down transformer. Outlet shall be accessible from outside the unit.

#### 4. Thermostat Controls:

- a. Programmable multi-stage thermostat shall have 7-day clock, holiday scheduling, large backlit display, remote sensor capability, and Title 24 compliance.
- b. Commercial Electronic Thermostat shall have 7-day time clock, auto-changeover, multi-stage capability, and large LCD (liquid crystal display) temperature display.

5. **Louvered hail Guard Package:**  
Louvered hail guard package shall protect coils against damage from hail and other flying debris.

6. **Condenser Coil Grille (Novation coil models 07-14):**  
Grille shall add decorative appearance to unit and protect condenser coil from large objects and vandalism.

## Guide Specification for CU-1,2

Project: ~Untitled65  
Prepared By:

05/30/2014  
03:47PM

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Edition Date: 03/11

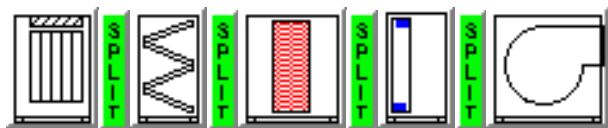
**Manufacturer reserves the right to change, at any time, specifications and designs without notice and without obligations.**

**Catalog No: GS-38AU-04PD**

Replaces: GS-38AU-03PD

Job Name      St Michael Archangel Church  
Mark for      AHU-3,4  
Date          May 30, 2014

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#### **Unit Parameters**

Aero Indoor Air Handler  
Unit Size: Size 08  
Insulation: R-13 Double Wall Sealed Panel  
Exterior Finish: Galvanized Exterior Panels  
Interior Finish: Galvanized Interior Panels  
Level I Thermal Break  
6 inch tall Base Rail

#### **Mixing Box**

Shipping Split After  
Damper: Top Premium Opposed  
Damper: Right Side Premium Parallel

#### **Angle Filter**

Shipping Split After  
2In. Angle Filter  
Construction Filters  
Qty (4) 16in. x 25in.  
Door Right Side

#### **Electric Heat Section**

Shipping Split After  
Factory Wired Panel Right Side  
28KW 480 Volts 3 Phase Unsheathed Element  
SCR Control

#### **Direct Expansion Coil**

Shipping Split After  
304 Stainless Steel Drain Pan Right Side  
Direct Expansion 7.64 sq.ft 4 Row 11 FPI Intertwined 1/2Circuit  
Coil Connection Right Side  
1/2 in. Tube Diameter  
AL fins Galv. Casing  
No Coating

---

SUBJECT TO CHANGE WITHOUT NOTICE



Job Name      St Michael Archangel Church  
Mark for      AHU-3,4  
Date          May 30, 2014

---

R-410A

### **Draw-Thru Supply Fan**

Rear Inlet

Fan Sled

Forward Curve B FCA12\_12A

1346 fanRPM Class I

Top Horiz. Front Discharge

Right Side Fan Motor Location

Spring Fan Isolation

Motor

3 HP Premium Efficiency ODP 208-230/460 3Ph 60Hz 1800 RPM

Manufacturer - Generic

Frame Size - 182T

Motor Shaft Diameter (in.) - 1.125

Voltage Selected - 460/3/60

Full Load Amps - 3.9

MCA - 4.9

MOCP - 6

Efficiency - 89.5%

Belt Drive

1.2 Service Factor

Fixed Pitch Drive

1 or more belts

Starter

Combination Starter & Non-fused Disconnect 460 Volts 3 Phase 60Hz

Door Right Side

### **Configuration Notes**

Preheat coil configurations can cause freezstat to trip if the downstream cooling coil isn't drained in heating season and/or PID valve control loop is too slow to react.

Electric heaters must have 12" clearance upstream and downstream from field installed components.

Discharge duct(s) must be gasketed and screwed directly to the discharge panel of the unit.

### **Weights and Dimensions**

(LxWxH in ft in) 11' 9" x 5' 2" x 3' 4" \*\*

Operating 1986 LB \*\*

Weights and Dimensions are approximate. Weights include base unit weight, coils (wet & dry), fans and fan motors, and other components, but does not include filters, drives and skids. Approximate dimensions are provided primarily for shipping purposes. Shipping skids are not included.  
All filter media efficiency ratings are for the filter media only.

---

SUBJECT TO CHANGE WITHOUT NOTICE

## DX Coil Performance Summary

Project: Untitled  
Tag: AHU-3,4

DX Cooling Application's Balance Criteria: Total Cooling

Coil Model \_\_\_\_\_  
Split Type \_\_\_\_\_  
Row / FPI / Circ \_\_\_\_\_  
Face Area Type \_\_\_\_\_  
Coil Face Area \_\_\_\_\_  
Face Velocity \_\_\_\_\_  
Fin-Casing Material \_\_\_\_\_  
Tube Diameter \_\_\_\_\_  
Tube spacing: Stf x Str \_\_\_\_\_  
Tube Wall Thickness \_\_\_\_\_  
Actual Airflow \_\_\_\_\_  
Site Altitude \_\_\_\_\_  
Total Cooling Capacity \_\_\_\_\_  
Sensible Cooling Capacity \_\_\_\_\_  
Air Friction \_\_\_\_\_

Carrier 28ME  
Intertwined Row Split (Dual Circuit)  
4 / 11 / HF



Large  
7.64 sqft  
458.1 fpm  
Al-Galv.  
0.5 in  
1.25 x 0.781 in  
0.016 in  
3500 CFM  
0 ft  
108.45 MBH  
82.49 MBH  
0.53 in wg

Condensing Unit 38AUD012(D) (Circuit B, Upstream Connections)

Nozzle Size \_\_\_\_\_

**Note: Nozzle Factory Supplied and Installed**

Number of TXV's \_\_\_\_\_  
TXV Tonnage \_\_\_\_\_  
Sat. Suction Temp. \_\_\_\_\_  
Sat. Cond. Temp. \_\_\_\_\_  
Tons Per Circuit \_\_\_\_\_

G4  
1  
4  
45.4 F  
117.8 F  
0.83 Tons

Condensing Unit 38AUD012(D) (Circuit A, Downstream Connections)

Nozzle Size \_\_\_\_\_

**Note: Nozzle Factory Supplied and Installed**

Number of TXV's \_\_\_\_\_  
TXV Tonnage \_\_\_\_\_  
Sat. Suction Temp. \_\_\_\_\_  
Sat. Cond. Temp. \_\_\_\_\_  
Tons Per Circuit \_\_\_\_\_

G3  
1  
4  
45.7 F  
118.3 F  
0.82 Tons

Condensing Ent. Air Temp \_\_\_\_\_

Suction Line Loss \_\_\_\_\_

Compressor Power \_\_\_\_\_

Vapor Superheat \_\_\_\_\_

Liquid Sub-Cooling \_\_\_\_\_

Entering Air Dry Bulb \_\_\_\_\_

Entering Air Wet Bulb \_\_\_\_\_

Entering Air Enthalpy \_\_\_\_\_

Leaving Air Dry Bulb \_\_\_\_\_

Leaving Air Wet Bulb \_\_\_\_\_

Leaving Air Enthalpy \_\_\_\_\_

Accessory PD \_\_\_\_\_

Cond vs Evap \_\_\_\_\_

Vertical Separation \_\_\_\_\_

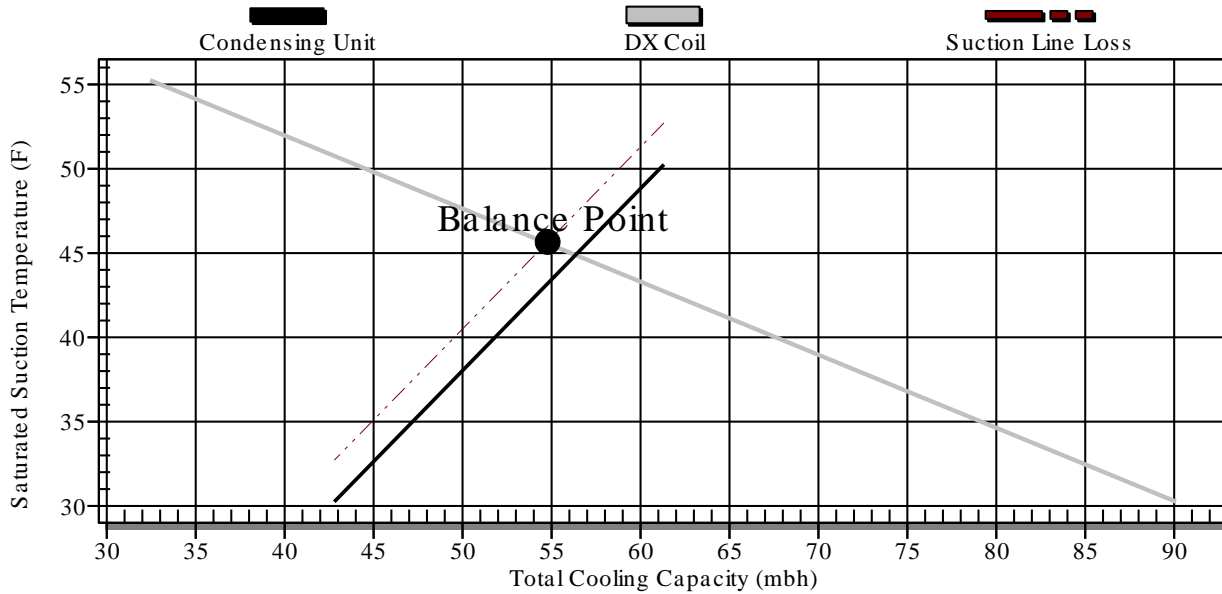
95.0 F  
2.7 F  
8.4 kW  
15.0 F  
15.0 F  
78.70 F  
65.30 F  
30.12 BTU/lb  
57.15 F  
55.11 F  
23.2 BTU/lb  
0.0 psig  
Even  
0.0 ft

## DX Coil Performance Summary

Project: Untitled  
Tag: AHU-3,4

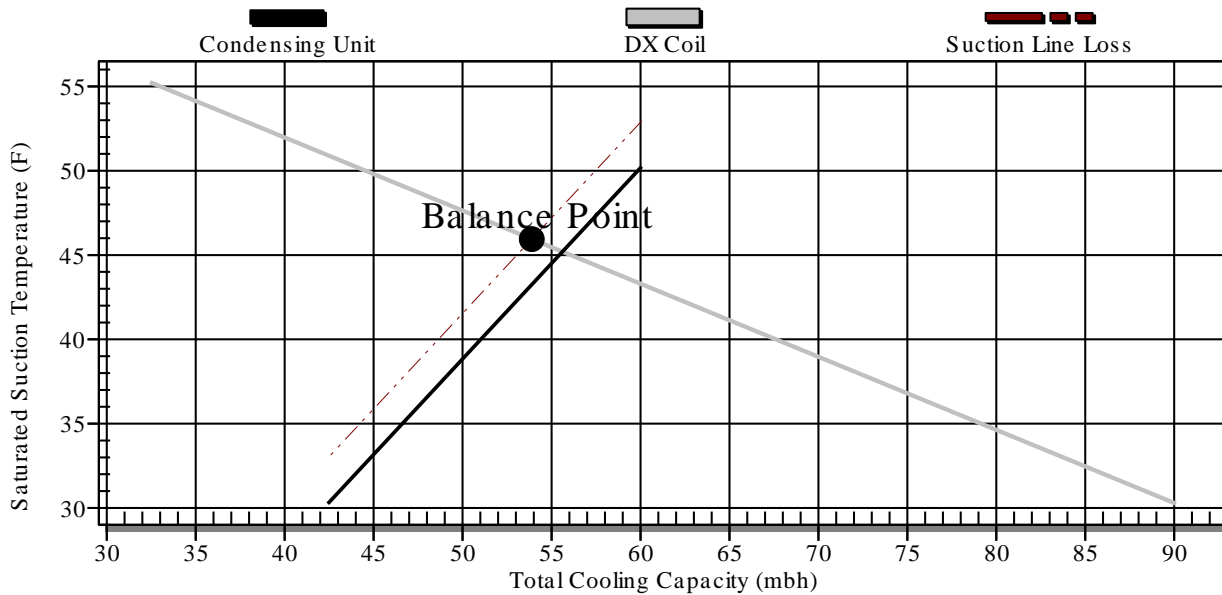
### DX Coil Cross-Plot

4 / 11 / HF 38AUD012(D) (Circuit B, Upstream Connections)



### DX Coil Cross-Plot

4 / 11 / HF 38AUD012(D) (Circuit A, Downstream Connections)



## Electric Heater Performance Summary

Project: Untitled  
Tag: AHU-3,4

Unit Size	08	
Coil Face Area	7.40	sqft
Face Velocity	473.0	ft/min
Actual Airflow	3500	CFM
Minimum Airflow	2590	CFM
Altitude	0	ft
Heating Capacity	95.56	MBH
kW	28	kW
Voltage, 3 phase	480	
FLA	34	
MCA	42	
MOCP	45	
Subcircuits	1	
Ent. Air Temperature	70.00	F
Lvg. Air Temperature	94.82	F
Air Friction	0.01	in wg

# Supply Fan Performance Summary

Project: Untitled  
Tag: AHU-3,4

Fan Model **39M**  
Unit Size **08**  
Fan Type **FORWARD CURVED**  
Fan Wheel Diameter **12**  
Fan Class **I**  
Fan Application **Draw Thru**  
Orientation **Horizontal**  
Actual Airflow, CFM **3500**  
Site Altitude, ft **0**  
Upstream Ext. Static, in wg **0.00**  
Downstream Ext. Static, in wg **1.00**  
Cooling Coil Static, in wg **0.53**  
Heating Coil Static, in wg **0.00**  
Other Losses, in wg **0.00**  
Total Accessory Static, in wg **1.18**  
Total Static Pressure, in wg **2.71**  
Calculated Fan RPM / Motor RPM **1346 / 1800**  
Class I Max. RPM **1533**  
Static Efficiency (%) **56**  
Fan BHP **2.6**

## Acoustic Data:

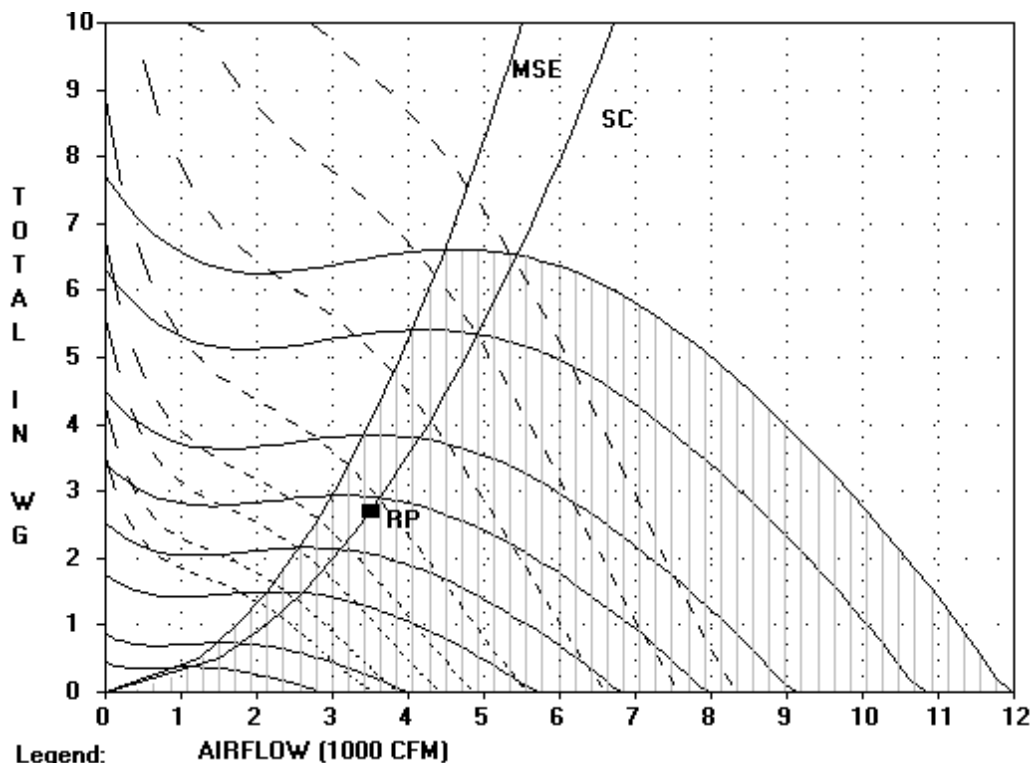
	Discharge	Inlet	Casing
63 Hz	90	82	81
125 Hz	86	79	77
250 Hz	91	76	75
500 Hz	81	65	65
1000 Hz	85	71	69
2000 Hz	78	64	62
4000 Hz	76	63	51
8000 Hz	72	56	47



Sound power levels for 39M units are rated in accordance with AHRI Standard 260.

## Accessories:

- (1) ANG Synthetic (2") MERV 13, Dirty [1.08]
- (1) Electric Heat [0.01]
- (1) Side Mixing or Exhaust Box [0.09]



Legend:

- RPM    - BHP    MSE - Max. Static Eff.    SC - System Curve    RP - Rated Point

RPM = 1346    BHP = 2.6    CLASS I MAX. RPM = 1533

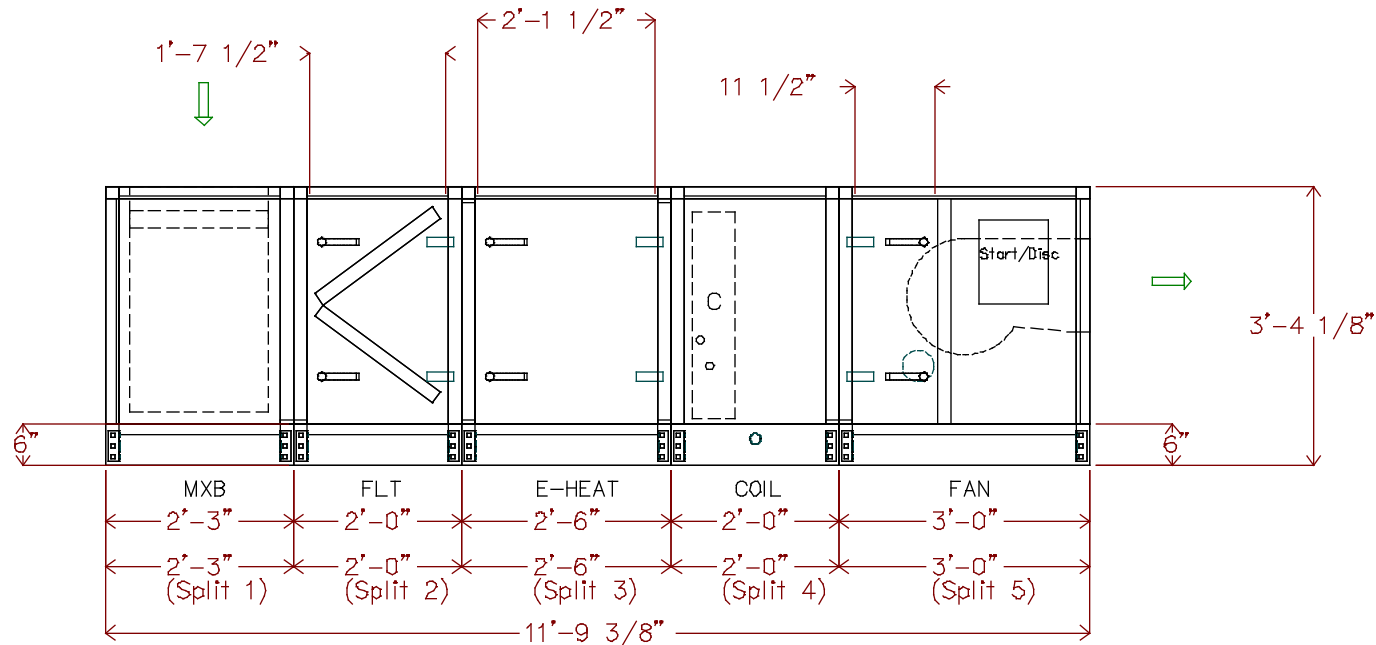
RPM's (x 100, L to R): 5 7.28571438789368 9.57142877578735 11.857143163681 14.14

BHP's (L to R): 0.8 1 1.5 2 3 5 7.5 10

Unit width: 5'-2 9/16" (plus lifting lugs)  
 2In. Angle Filter  
 Qty (4) 16in. x 25in.  
 Direct Expansion 4 Row 11 FPI Intertwined 1/2" Circuit (qty. 1)  
 2 @ 0.875" diameter distributor(s)  
 Draw-Thru Supply Fan

3 HP Premium Efficiency ODP 208-230/460 3Ph 60Hz 1800 RPM  
 Operating weight: 1987.0 lbs.  
 Upstream Corner Weight (each): 424.0 lbs.  
 Downstream Corner Weight (each): 569.0 lbs.

Split	Airway Length	Weight (lbs.)
(Split 1)	2'-3"	295
(Split 2)	2'-0"	302
(Split 3)	2'-6"	301
(Split 4)	2'-0"	304
(Split 5)	3'-0"	785



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 A United Technologies Company

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39MN

DATE  
 5/30/2014

Configurator Ver.  
 v6.34 02/11/14

39M Central Station Air-Handler, Size 08  
 St Michael Archangel Church: AHU-3,4  
 Assembly Drawing

REVISION  
 Side View

Unit viewed from right side of side elevation view.  
 Unit length: 11'-9 3/8"  
 2in. Angle Filter  
 Qty (4) 16in. x 25in.  
 Direct Expansion 4 Row 11 FPI Intertwined 1/2Circuit (qty. 1)  
 2 @ 0.875" diameter distributor(s)

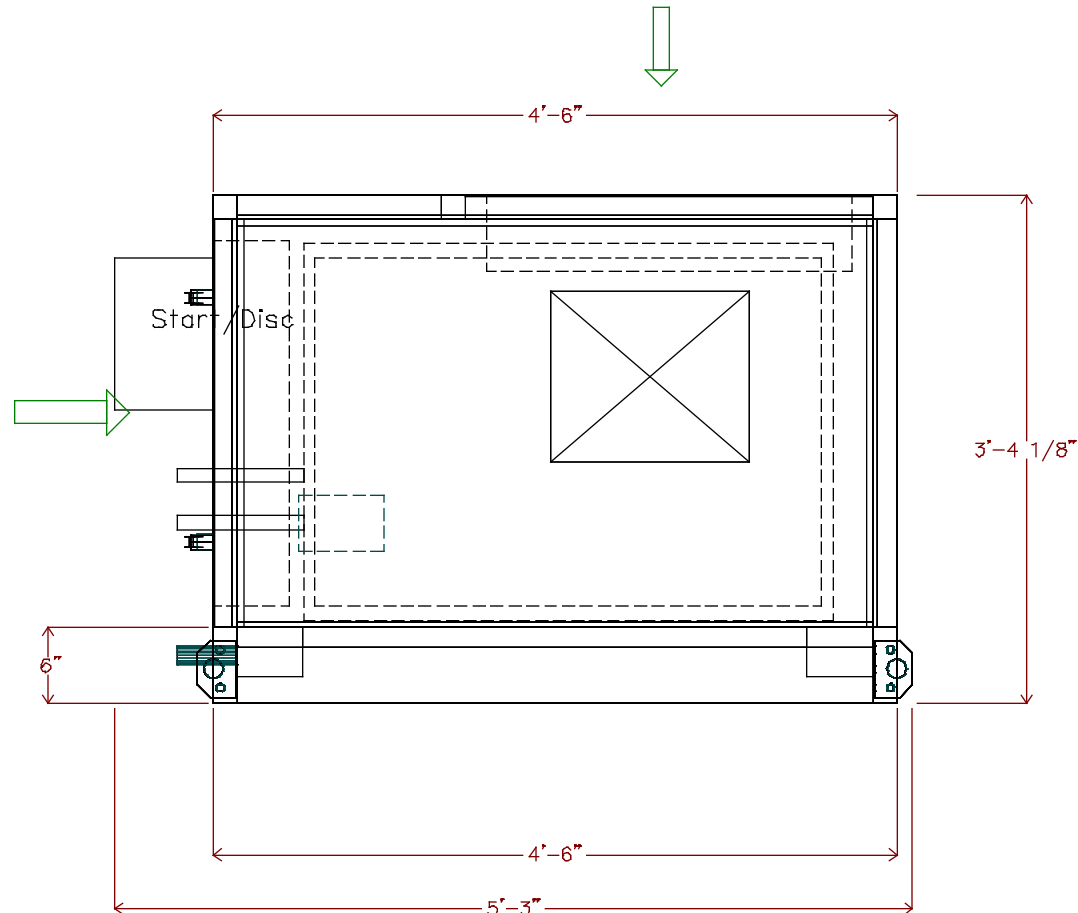
Draw-Thru Supply Fan  
 3 HP Premium Efficiency ODP 208-230/460 3Ph 60Hz 1800 RPM  
 Operating weight: 1987.0 lbs.  
 Upstream Corner Weight (each): 424.0 lbs.  
 Downstream Corner Weight (each): 569.0 lbs.



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DATE  
5/30/2014

Configurator Ver.  
v6.34 02/11/14

39M Central Station Air-Handler, Size 08  
 St Michael Archangel Church: AHU-3,4  
 Assembly Drawing

REVISION  
End View

Unit height: 3'-4 1/8"  
 2In. Angle Filter  
 Qty (4) 16in. x 25in.  
 Direct Expansion 4 Row 11 FPI Intertwined 1/2Circuit (qty. 1)  
 2 @ 0.875" diameter distributor(s)  
 Draw-Thru Supply Fan

3 HP Premium Efficiency ODP 208-230/460 3Ph 60Hz 1800 RPM  
 Operating weight: 1987.0 lbs.  
 Upstream Corner Weight (each): 424.0 lbs.  
 Downstream Corner Weight (each): 569.0 lbs.

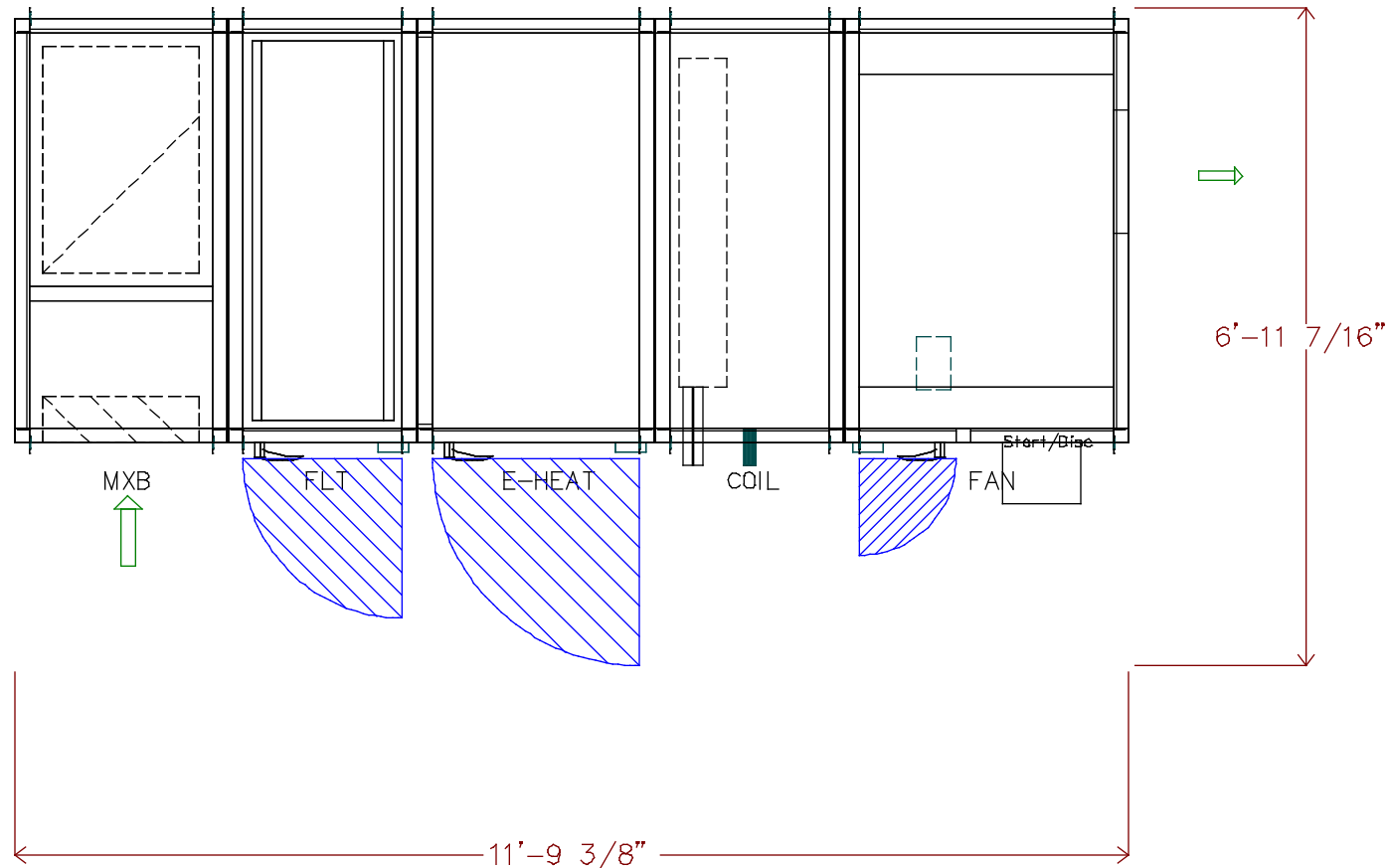


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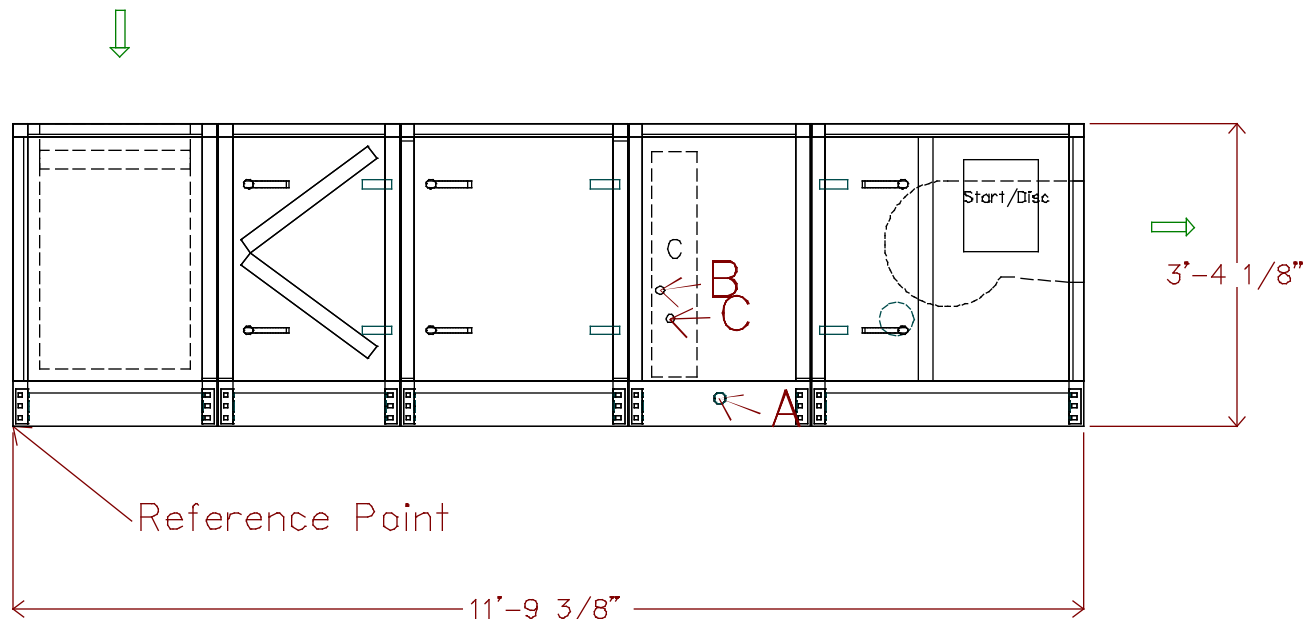
39M Central Station Air-Handler, Size 08  
 St Michael Archangel Church: AHU-3,4  
 Assembly Drawing

REVISION  
 Top View



Direct Expansion 4 Row 11 FPI Intertwined 1/2Circuit (qty. 1)  
 2 @ 0.875" diameter distributor(s)

Pipe	x	y	diameter	Usage
A	7'-9 5/16"	3 13/16"	1 1/2"	DrainPan
B	7'-1 7/16"	1'-6"	1 1/8"	Suction
C	7'-2 3/4"	1'-2 1/4"	1 1/8"	Suction



DATE  
 5/30/2014

Configurator Ver.  
 v6.34 02/11/14

39M Central Station Air-Handler, Size 08  
 St Michael Archangel Church: AHU-3,4  
 Assembly Drawing

REVISION  
 Side View

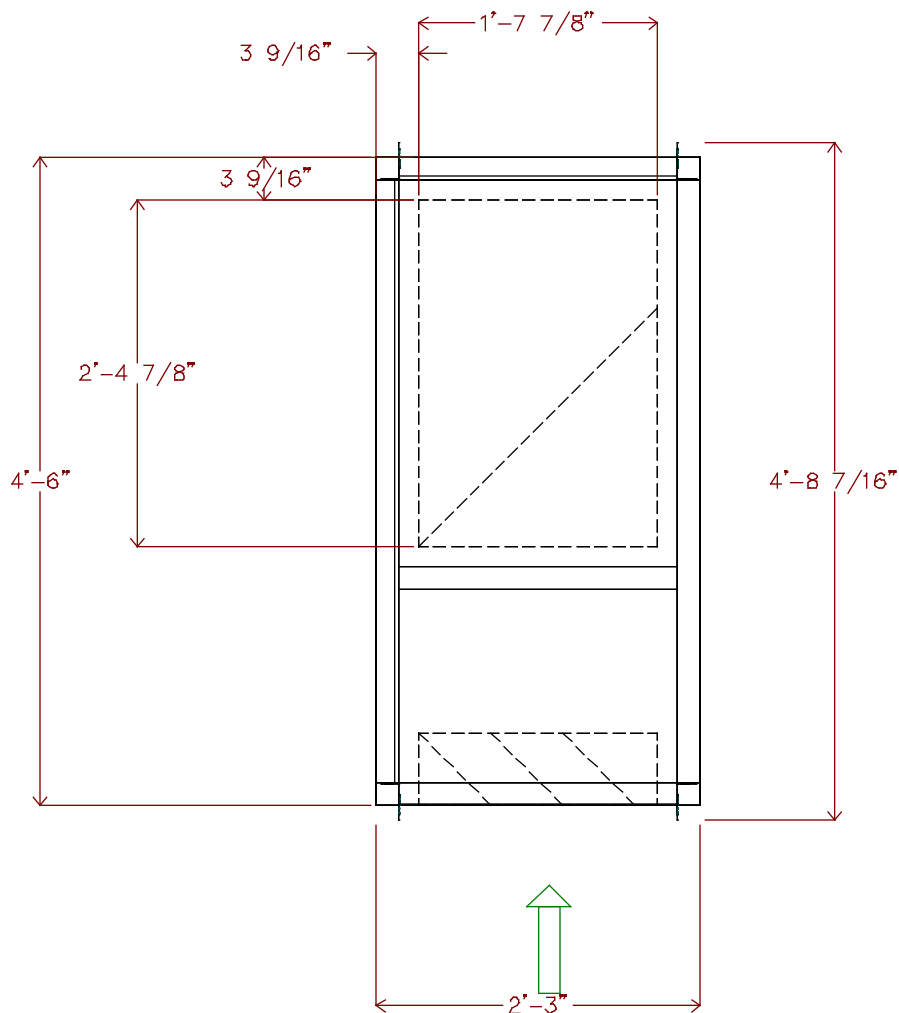


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DATE  
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v6.34 02/11/14

39M Central Station Air-Handler, Size 08  
St Michael Archangel Church: AHU-3,4  
Mixing Box

REVISION  
Top View

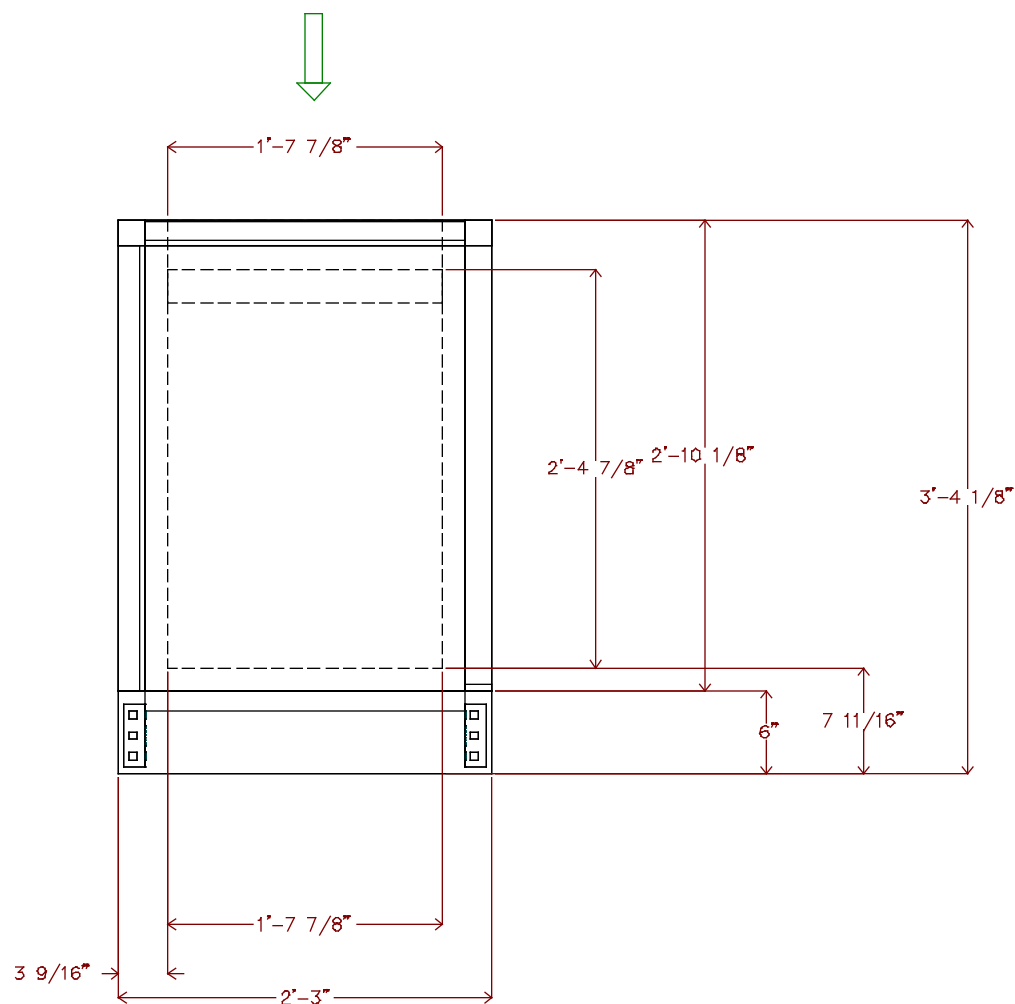


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DATE  
5/30/2014

Configurator Ver.  
v6.34 02/11/14

39M Central Station Air-Handler, Size 08  
St Michael Archangel Church: AHU-3,4  
Mixing Box

REVISION  
Side View



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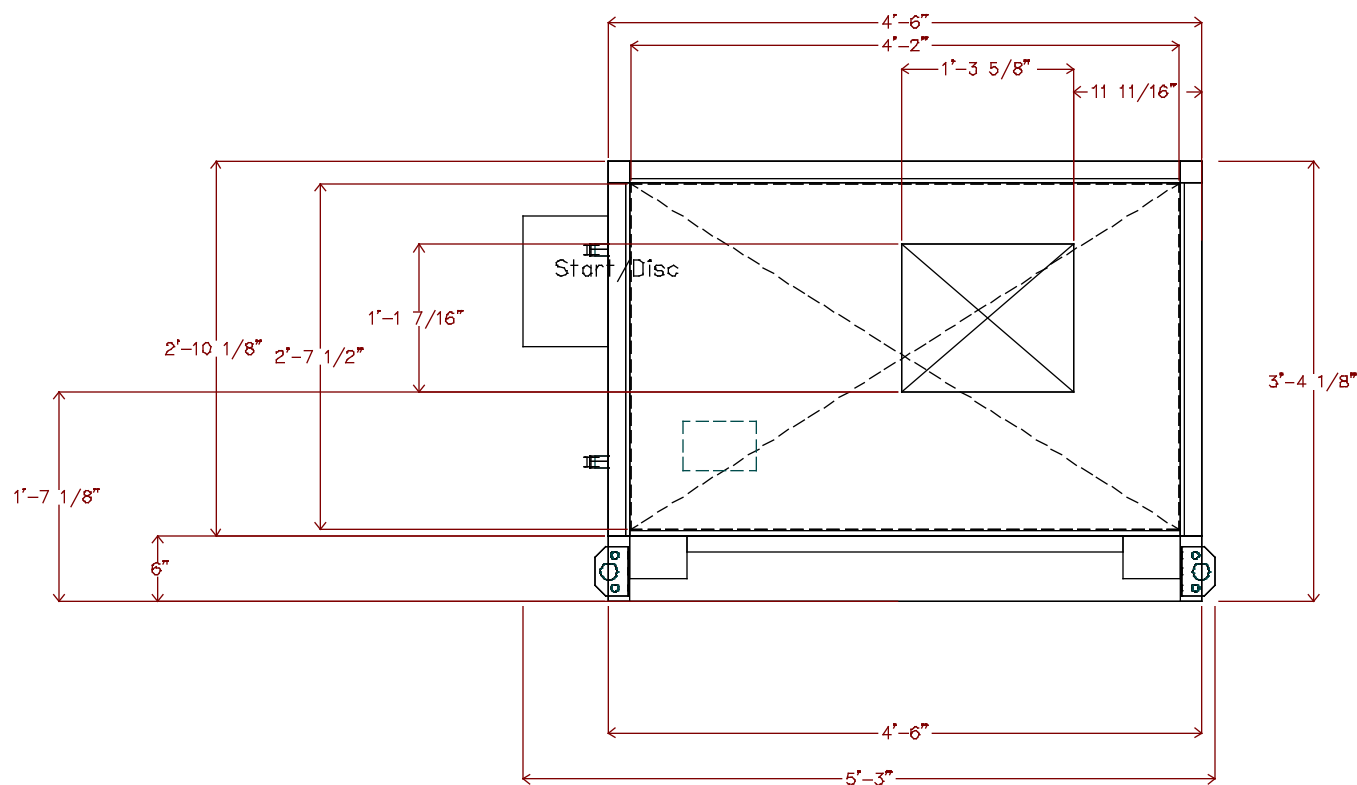
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39MN

Unit viewed from right side of side elevation view.

Draw-Thru Supply Fan

3 HP Premium Efficiency ODP 208-230/460 3Ph 60Hz 1800 RPM



DATE  
5/30/2014

Configurator Ver.  
v6.34 02/11/14

39M Central Station Air-Handler, Size 08  
St Michael Archangel Church: AHU-3,4  
Draw-Thru Supply Fan

REVISION  
End View

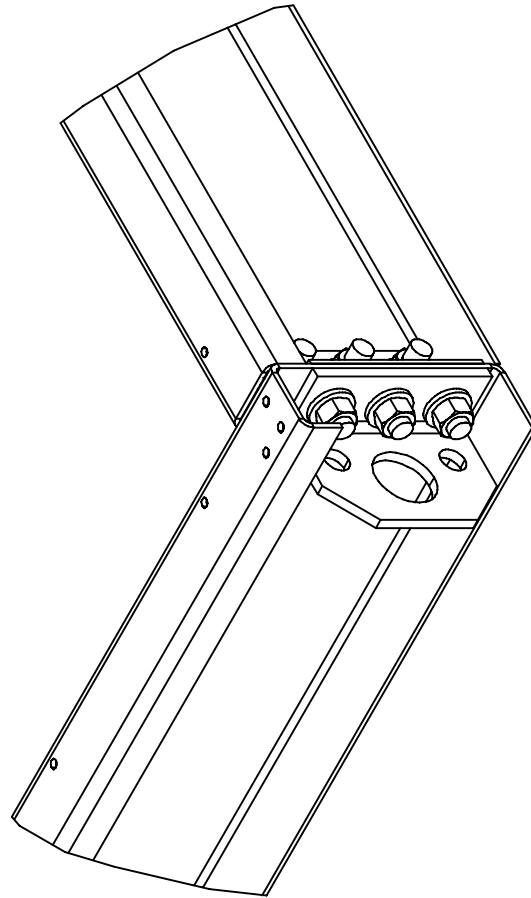
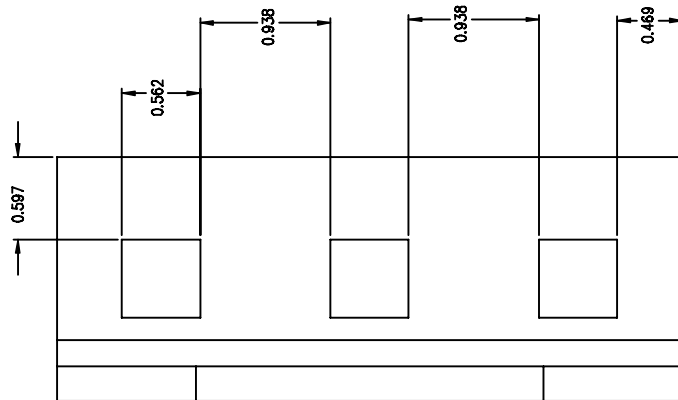
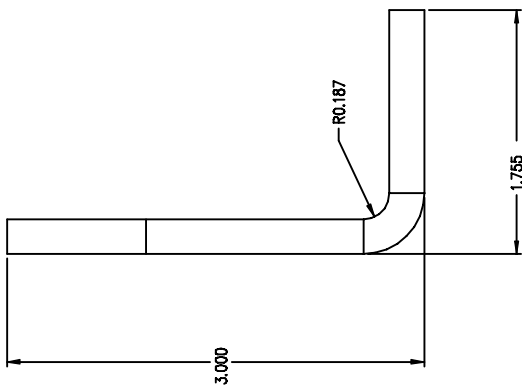
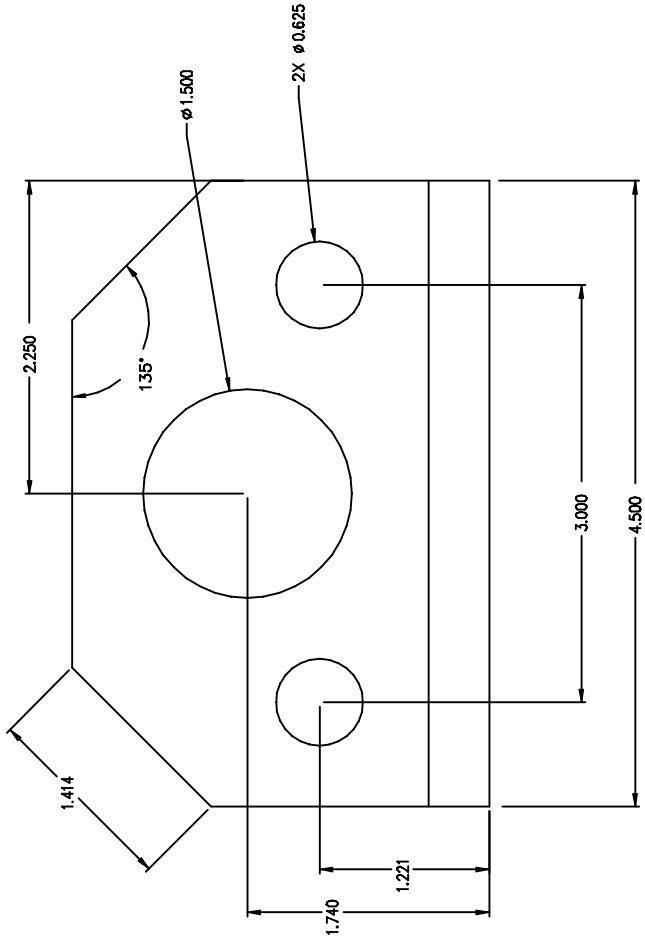


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39MN



REVISION  
39M Central Station Air-Handler, Size: 03 - 110  
6" Base rail and Lifting Lug Detail



Carrier

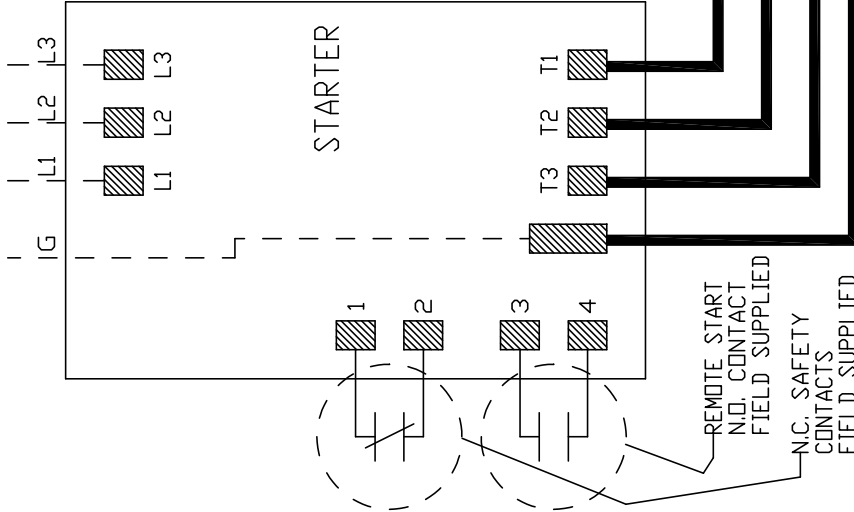
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39M

FIELD SUPPLIED WIRING  
PER "NEC" CODE



WIRING DIAGRAM  
STARTER  
3 PHASE

MOTOR

YELLOW  
BLUE  
BLACK  
GND

GREEN OR BARE COPPER

NOTES:

- 1) MOTOR CONNECTIONS L4 THRU L9 NOT SHOWN. CONNECT PER MOTOR MANUFACTURERS RECOMMENDATIONS AND SPECIFIED OPERATING VOLTAGE.
- 2) CHECK FOR CORRECT MOTOR ROTATION AFTER WIRING. TO REVERSE MOTOR ROTATION, REVERSE FIELD LINE VOLTAGE WIRING ON TERMINALS L1 AND L2.
- 3) REMOVE FACTORY INSTALLED JUMPER WIRE BETWEEN TERMINALS 1 AND 2 BEFORE CONNECTING SAFETY CONTACT (LTT/HPS).
- 4) FIELD WIRING MUST BE IN ACCORDANCE WITH "NEC" CODE AND LOCAL CODE REQUIREMENTS. REFER TO INSTALLATION INSTRUCTION FOR MINIMUM WIRE GAUGE REQUIREMENTS.
- 5) ALL FACTORY WIRING IS RATED FOR 90 DEGREES C, TYPE THHN. REPLACE WITH SAME SIZE AND TYPE AS ORIGINALLY SUPPLIED.

39MA51003756 -

39M Central Station Air-Handler, Size: 03 - 61  
Three Phase Starter Wiring Detail

REVISION

## Air Filter Submittal

Project: Untitled  
Unit Tag: AHU-3,4

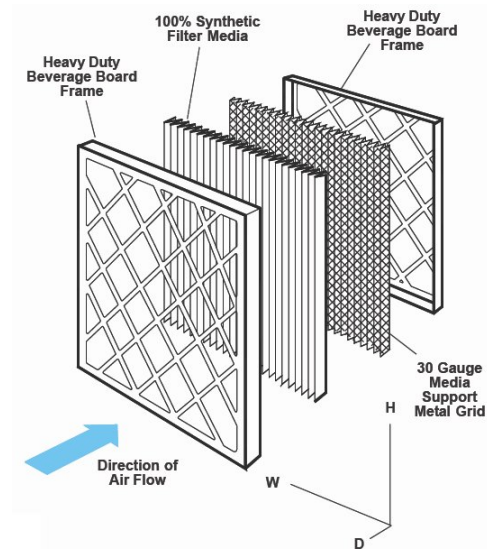
Carrier Part Number .....	31KFG39MD008822
Kit Description .....	Filter Kit, 2" ANG/FMB Pleated (MERV13), 39M008
Unit Airflow, CFM .....	3500
Filter Velocity, FPM .....	315
Filter Sizes and Quantities .....	Qty (4) 16in. x 25in.

## Quality Pleat

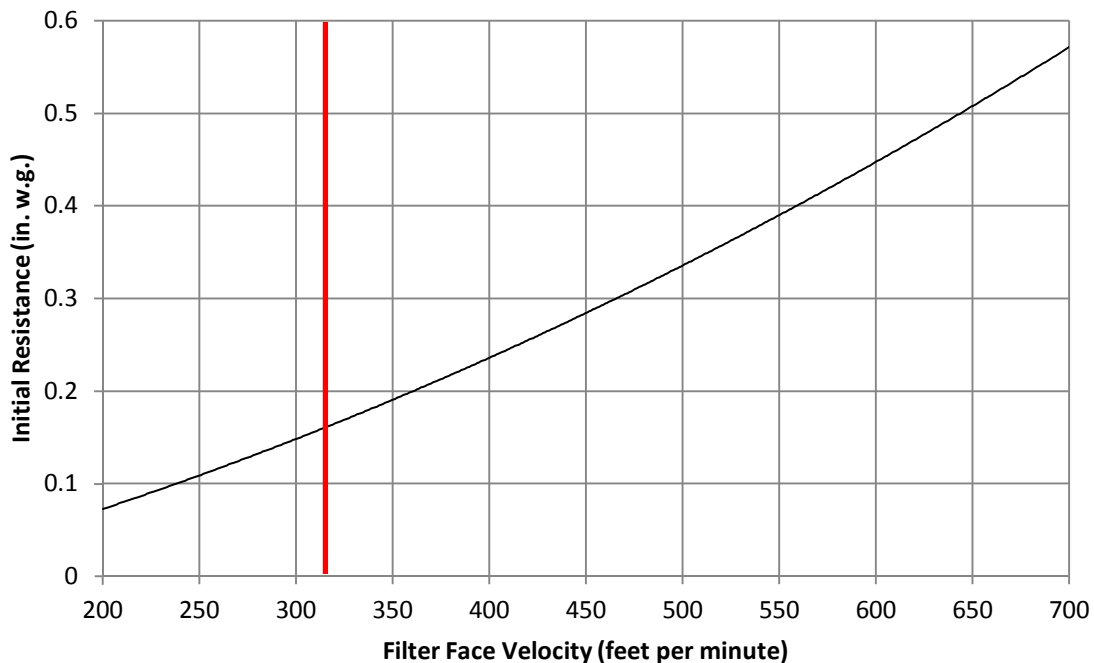
### MERV 13 Pleated Filter

The 100% synthetic graduated density media is continuously bonded to a 30 gauge galvanized, corrosion resistant, expanded metal support grid with an effective open area of 96%. The media is resistant to a wide range of chemicals, does not absorb moisture and will not support microbial growth.

The controlled pleat spacing maximizes surface area and dust holding capacity and is bonded to the enclosure frame to prevent dust bypass. The enclosure frame is constructed of high wet strength moisture resistant beverage board. The diagonal support members of the frame are bonded to the entering and exiting apexes of each pleat to prevent pleat collapse and filter bowing.

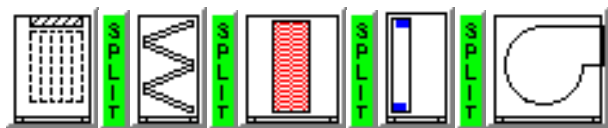


### Filter Pleated (2") MERV 13



Job Name      St Michael Archangel Church  
Mark for      AHU-5  
Date          May 30, 2014

---



#### **Unit Parameters**

Aero Indoor Air Handler  
Unit Size: Size 08  
Insulation: R-13 Double Wall Sealed Panel  
Exterior Finish: Galvanized Exterior Panels  
Interior Finish: Galvanized Interior Panels  
Level I Thermal Break  
6 inch tall Base Rail

#### **Mixing Box**

Shipping Split After  
Damper: Top Premium Opposed  
Damper: Left Side Premium Parallel

#### **Angle Filter**

Shipping Split After  
2In. Angle Filter  
Construction Filters  
Qty (4) 16in. x 25in.  
Door Left Side

#### **Electric Heat Section**

Shipping Split After  
Factory Wired Panel Left Side  
28KW 480 Volts 3 Phase Unsheathed Element  
SCR Control

#### **Direct Expansion Coil**

Shipping Split After  
304 Stainless Steel Drain Pan Left Side  
Direct Expansion 7.64 sq.ft 4 Row 14 FPI Intertwined 1/2Circuit  
Coil Connection Left Side  
1/2 in. Tube Diameter  
AL fins Galv. Casing  
No Coating

---

SUBJECT TO CHANGE WITHOUT NOTICE



Job Name      St Michael Archangel Church  
Mark for      AHU-5  
Date          May 30, 2014

---

R-410A

### **Draw-Thru Supply Fan**

Rear Inlet

Fan Sled

Forward Curve B FCA12\_12A

1337 fanRPM Class I

Top Horiz. Front Discharge

Left Side Fan Motor Location

Spring Fan Isolation

Motor

3 HP Premium Efficiency ODP 208-230/460 3Ph 60Hz 1800 RPM

Manufacturer - Generic

Frame Size - 182T

Motor Shaft Diameter (in.) - 1.125

Voltage Selected - 460/3/60

Full Load Amps - 3.9

MCA - 4.9

MOCP - 6

Efficiency - 89.5%

Belt Drive

1.2 Service Factor

Fixed Pitch Drive

1 or more belts

Starter

Combination Starter & Non-fused Disconnect 460 Volts 3 Phase 60Hz

Door Left Side

### **Configuration Notes**

Preheat coil configurations can cause freezstat to trip if the downstream cooling coil isn't drained in heating season and/or PID valve control loop is too slow to react.

Electric heaters must have 12" clearance upstream and downstream from field installed components.

Discharge duct(s) must be gasketed and screwed directly to the discharge panel of the unit.

### **Weights and Dimensions**

(LxWxH in ft in) 11' 9" x 5' 2" x 3' 4" \*\*

Operating 1991 LB \*\*

Weights and Dimensions are approximate. Weights include base unit weight, coils (wet & dry), fans and fan motors, and other components, but does not include filters, drives and skids. Approximate dimensions are provided primarily for shipping purposes. Shipping skids are not included.  
All filter media efficiency ratings are for the filter media only.

---

SUBJECT TO CHANGE WITHOUT NOTICE

## DX Coil Performance Summary

Project: Untitled  
Tag: AHU-5

DX Cooling Application's Balance Criteria: Total Cooling

Coil Model \_\_\_\_\_  
Split Type \_\_\_\_\_  
Row / FPI / Circ \_\_\_\_\_  
Face Area Type \_\_\_\_\_  
Coil Face Area \_\_\_\_\_  
Face Velocity \_\_\_\_\_  
Fin-Casing Material \_\_\_\_\_  
Tube Diameter \_\_\_\_\_  
Tube spacing: Stf x Str \_\_\_\_\_  
Tube Wall Thickness \_\_\_\_\_  
Actual Airflow \_\_\_\_\_  
Site Altitude \_\_\_\_\_  
Total Cooling Capacity \_\_\_\_\_  
Sensible Cooling Capacity \_\_\_\_\_  
Air Friction \_\_\_\_\_

**Carrier 28ME**  
**Intertwined Row Split (Dual Circuit)**  
**4 / 14 / HF**



Condensing Unit 38AUD012(D) (Circuit B, Upstream Connections)

Nozzle Size \_\_\_\_\_

**Note: Nozzle Factory Supplied and Installed**

Number of TXV's \_\_\_\_\_  
TXV Tonnage \_\_\_\_\_  
Sat. Suction Temp. \_\_\_\_\_  
Sat. Cond. Temp. \_\_\_\_\_  
Tons Per Circuit \_\_\_\_\_

Condensing Unit 38AUD012(D) (Circuit A, Downstream Connections)

Nozzle Size \_\_\_\_\_

**Note: Nozzle Factory Supplied and Installed**

Number of TXV's \_\_\_\_\_  
TXV Tonnage \_\_\_\_\_  
Sat. Suction Temp. \_\_\_\_\_  
Sat. Cond. Temp. \_\_\_\_\_  
Tons Per Circuit \_\_\_\_\_

Condensing Ent. Air Temp \_\_\_\_\_

Suction Line Loss \_\_\_\_\_

Compressor Power \_\_\_\_\_

Vapor Superheat \_\_\_\_\_

Liquid Sub-Cooling \_\_\_\_\_

Entering Air Dry Bulb \_\_\_\_\_

Entering Air Wet Bulb \_\_\_\_\_

Entering Air Enthalpy \_\_\_\_\_

Leaving Air Dry Bulb \_\_\_\_\_

Leaving Air Wet Bulb \_\_\_\_\_

Leaving Air Enthalpy \_\_\_\_\_

Accessory PD \_\_\_\_\_

Cond vs Evap \_\_\_\_\_

Vertical Separation \_\_\_\_\_

**Large**  
**7.64** sqft  
**445.0** fpm  
**Al-Galv.**  
**0.5** in  
**1.25 x 0.781** in  
**0.016** in  
**3400** CFM  
**0** ft  
**107.60** MBH  
**83.58** MBH  
**0.52** in wg

**G4**

**1**

**4**

**45.0** F

**117.7** F

**0.82** Tons

**G3**

**1**

**3**

**45.2** F

**118.2** F

**0.81** Tons

**95.0** F

**2.7** F

**8.4** kW

**15.0** F

**15.0** F

**78.70** F

**65.30** F

**30.12** BTU/lb

**56.22** F

**54.87** F

**23.1** BTU/lb

**0.0** psig

**Even**

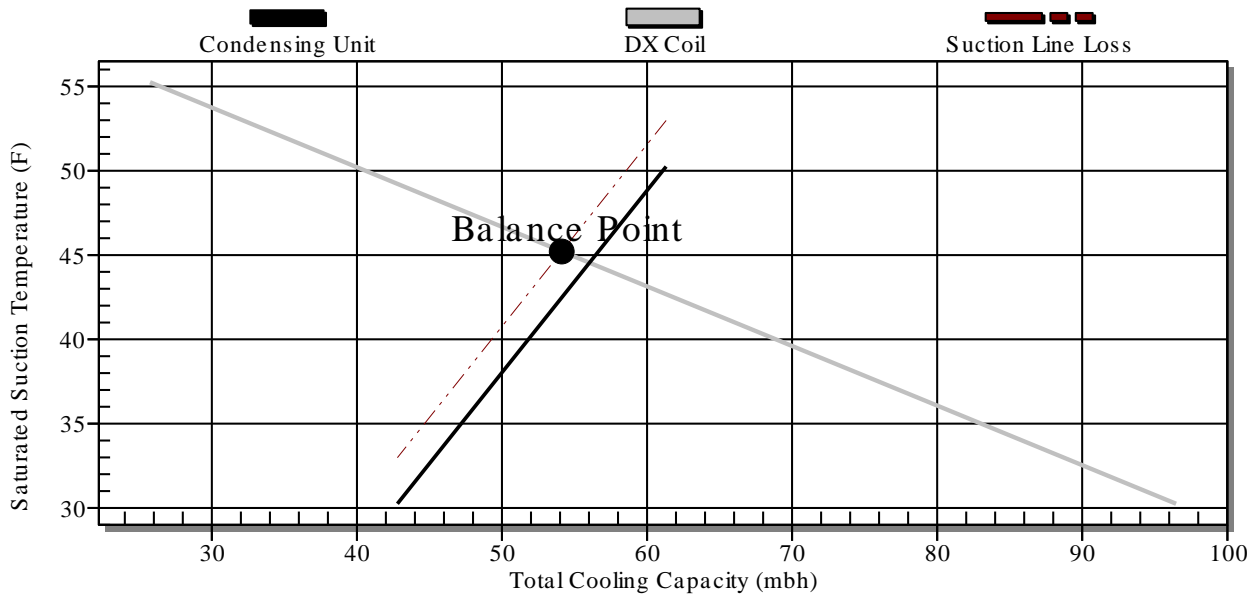
**0.0** ft

## DX Coil Performance Summary

Project: Untitled  
Tag: AHU-5

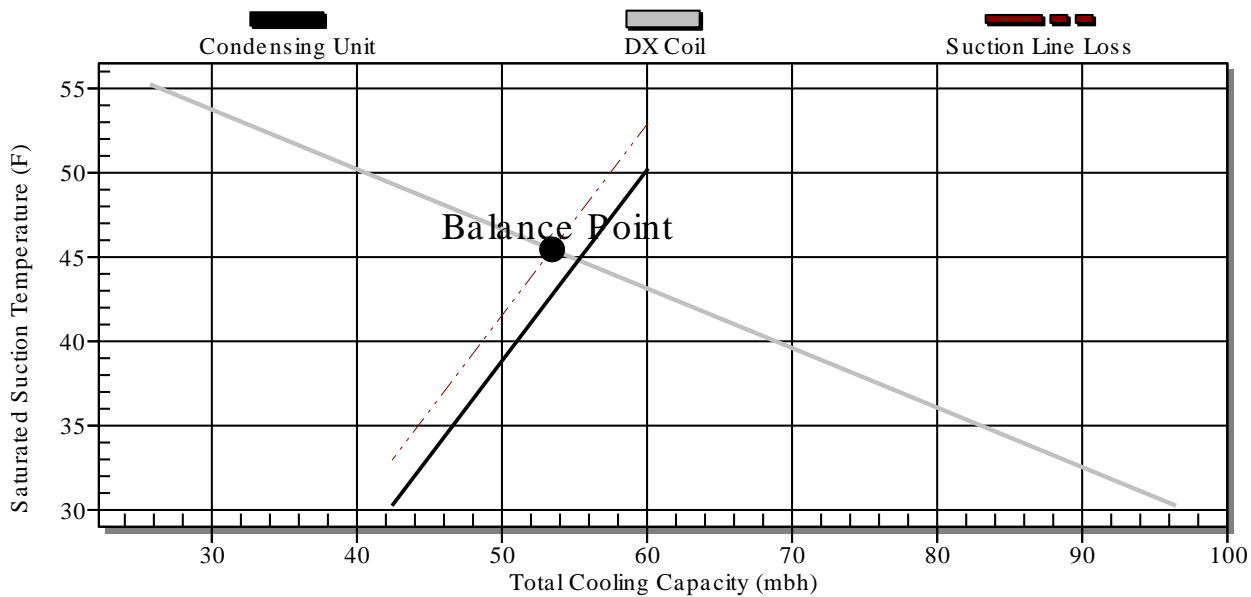
### DX Coil Cross-Plot

4 / 14 / HF 38AUD012(D) (Circuit B, Upstream Connections)



### DX Coil Cross-Plot

4 / 14 / HF 38AUD012(D) (Circuit A, Downstream Connections)



## Electric Heater Performance Summary

Project: Untitled  
Tag: AHU-5

Unit Size	08	
Coil Face Area	7.40	sqft
Face Velocity	459.5	fpm
Actual Airflow	3400	CFM
Minimum Airflow	2590	CFM
Altitude	0	ft
Heating Capacity	95.56	MBH
kW	28	kW
Voltage, 3 phase	480	
FLA	34	
MCA	42	
MOCP	45	
Subcircuits	1	
Ent. Air Temperature	70.00	F
Lvg. Air Temperature	95.55	F
Air Friction	0.01	in wg

# Supply Fan Performance Summary

Project: Untitled  
Tag: AHU-5

Fan Model **39M**  
Unit Size **08**  
Fan Type **FORWARD CURVED**  
Fan Wheel Diameter **12**  
Fan Class **I**  
Fan Application **Draw Thru**  
Orientation **Horizontal**  
Actual Airflow, CFM **3400**  
Site Altitude, ft **0**  
Upstream Ext. Static, in wg **0.00**  
Downstream Ext. Static, in wg **1.00**  
Cooling Coil Static, in wg **0.52**  
Heating Coil Static, in wg **0.00**  
Other Losses, in wg **0.00**  
Total Accessory Static, in wg **1.17**  
Total Static Pressure, in wg **2.69**  
Calculated Fan RPM / Motor RPM **1337 / 1800**  
Class I Max. RPM **1533**  
Static Efficiency (%) **57**  
Fan BHP **2.5**

## Acoustic Data:

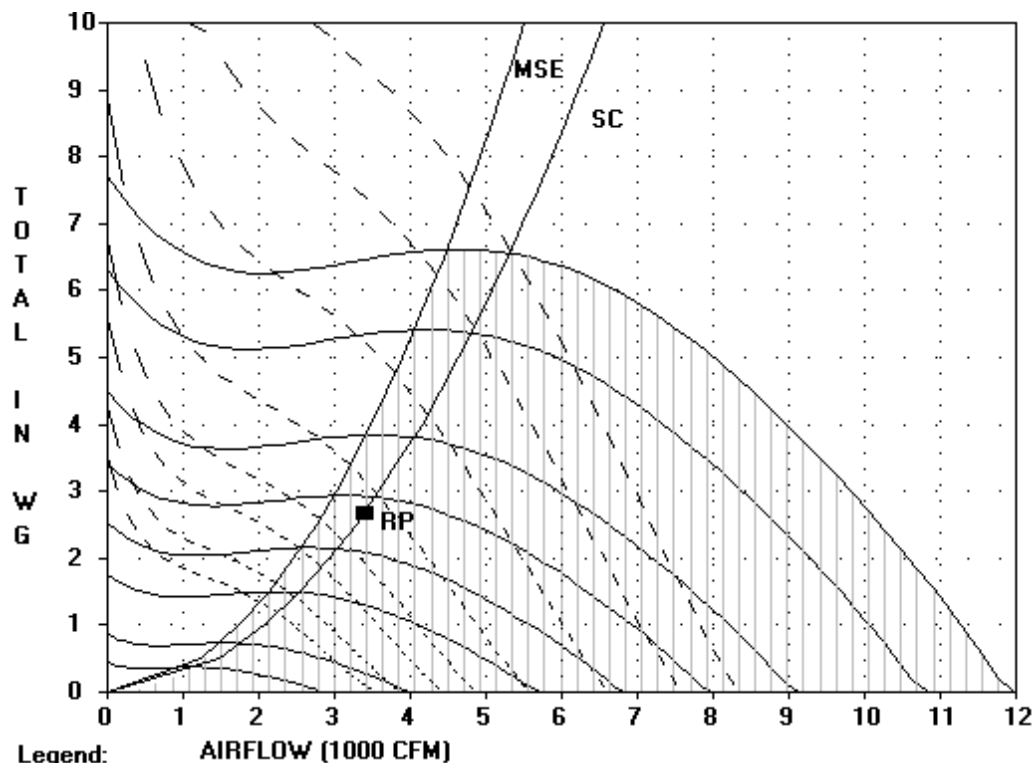
	Discharge	Inlet	Casing
63 Hz	90	82	81
125 Hz	86	79	77
250 Hz	91	76	75
500 Hz	81	65	65
1000 Hz	85	71	69
2000 Hz	78	64	62
4000 Hz	76	63	51
8000 Hz	71	55	46



Sound power levels for 39M units are rated in accordance with AHRI Standard 260.

## Accessories:

- (1) ANG Synthetic (2") MERV 13, Dirty [1.08]
- (1) Electric Heat [0.01]
- (1) Side Mixing or Exhaust Box [0.08]



Legend:

- RPM    - BHP    MSE - Max. Static Eff.    SC - System Curve    RP - Rated Point

RPM = 1337    BHP = 2.5    CLASS I MAX. RPM = 1533

RPM's (x 100, L to R): 5 7.28571438789368 9.57142877578735 11.857143163681 14.14

BHP's (L to R): 0.8 1 1.5 2 3 5 7.5 10

Unit width: 5'-2 9/16" (plus lifting lugs)

2in. Angle Filter

Qty (4) 16in. x 25in.

Direct Expansion 4 Row 14 FPI Intertwined 1/2 Circuit (qty. 1)

2 @ 0.875" diameter distributor(s)

Draw-Thru Supply Fan

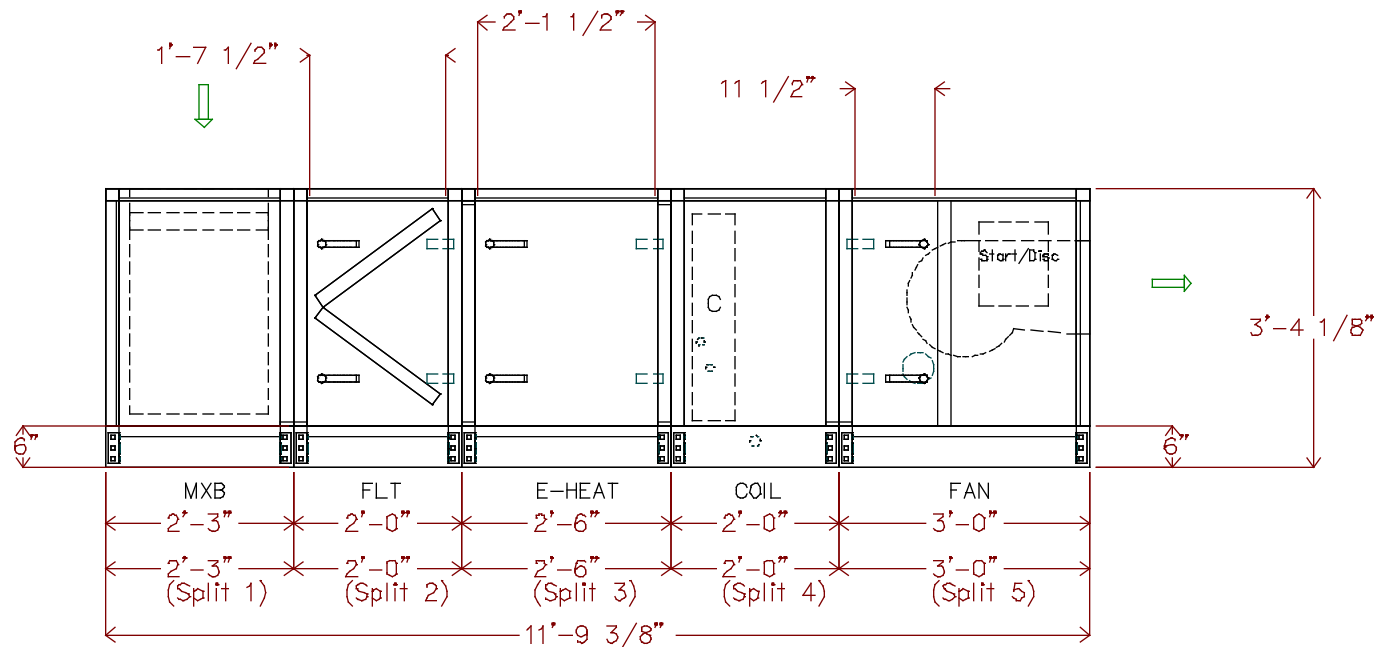
3 HP Premium Efficiency ODP 208-230/460 3Ph 60Hz 1800 RPM

Operating weight: 1991.0 lbs.

Upstream Corner Weight (each): 425.0 lbs.

Downstream Corner Weight (each): 570.0 lbs.

Split	Airway Length	Weight (lbs.)
(Split 1)	2'-3"	295
(Split 2)	2'-0"	302
(Split 3)	2'-6"	301
(Split 4)	2'-0"	308
(Split 5)	3'-0"	785



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A United Technologies Company

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39MN

DATE  
5/30/2014

Configurator Ver.  
v6.34 02/11/14

39M Central Station Air-Handler, Size 08  
St Michael Archangel Church: AHU-5  
Assembly Drawing

REVISION  
Side View

Unit viewed from right side of side elevation view.

Unit length: 11'-9 3/8"

2in. Angle Filter

Qty (4) 16in. x 25in.

Direct Expansion 4 Row 14 FPI Intertwined 1/2Circuit (qty. 1)

2 @ 0.875" diameter distributor(s)

Draw-Thru Supply Fan

3 HP Premium Efficiency ODP 208-230/460 3Ph 60Hz 1800 RPM

Operating weight: 1991.0 lbs.

Upstream Corner Weight (each): 425.0 lbs.

Downstream Corner Weight (each): 570.0 lbs.

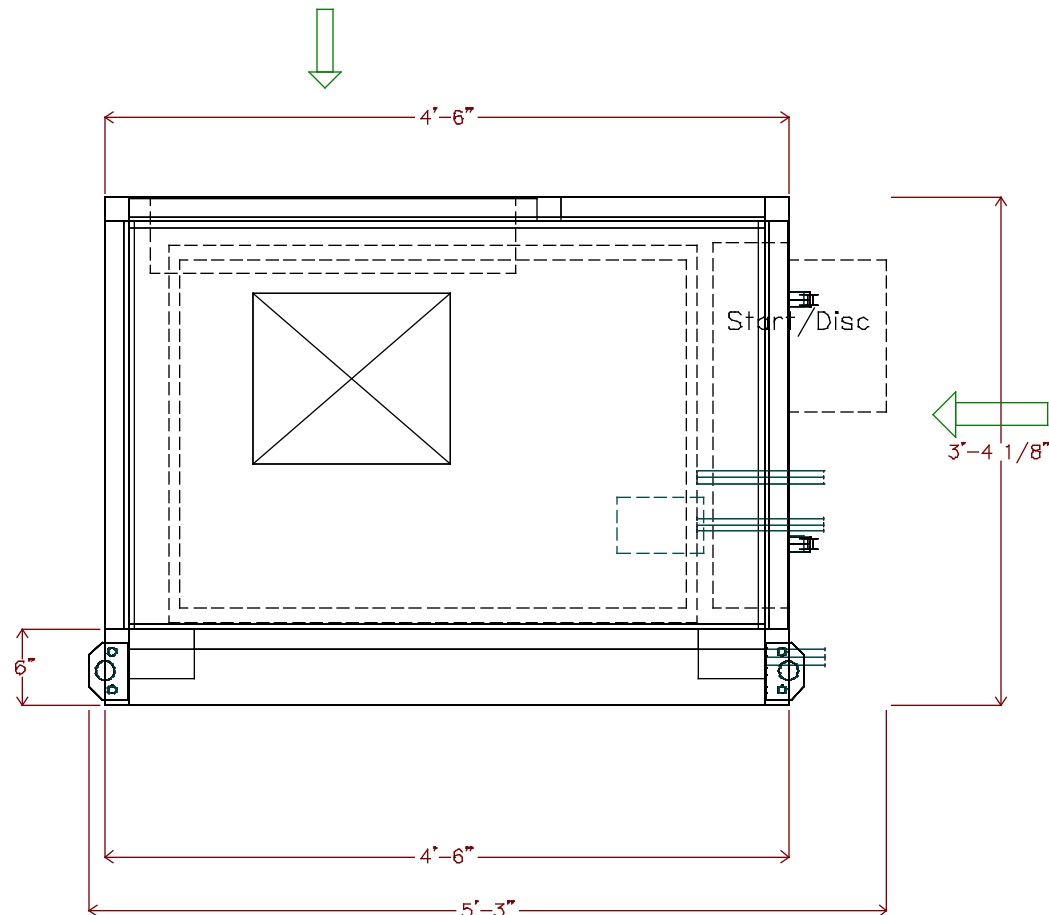


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DATE  
5/30/2014

Configurator Ver.  
v6.34 02/11/14

39M Central Station Air-Handler, Size 08  
St Michael Archangel Church: AHU-5  
Assembly Drawing

REVISION  
End View

Unit height: 3'-4 1/8"  
 2In. Angle Filter  
 Qty (4) 16in. x 25in.  
 Direct Expansion 4 Row 14 FPI Intertwined 1/2Circuit (qty. 1)  
 2 @ 0.875" diameter distributor(s)  
 Draw-Thru Supply Fan

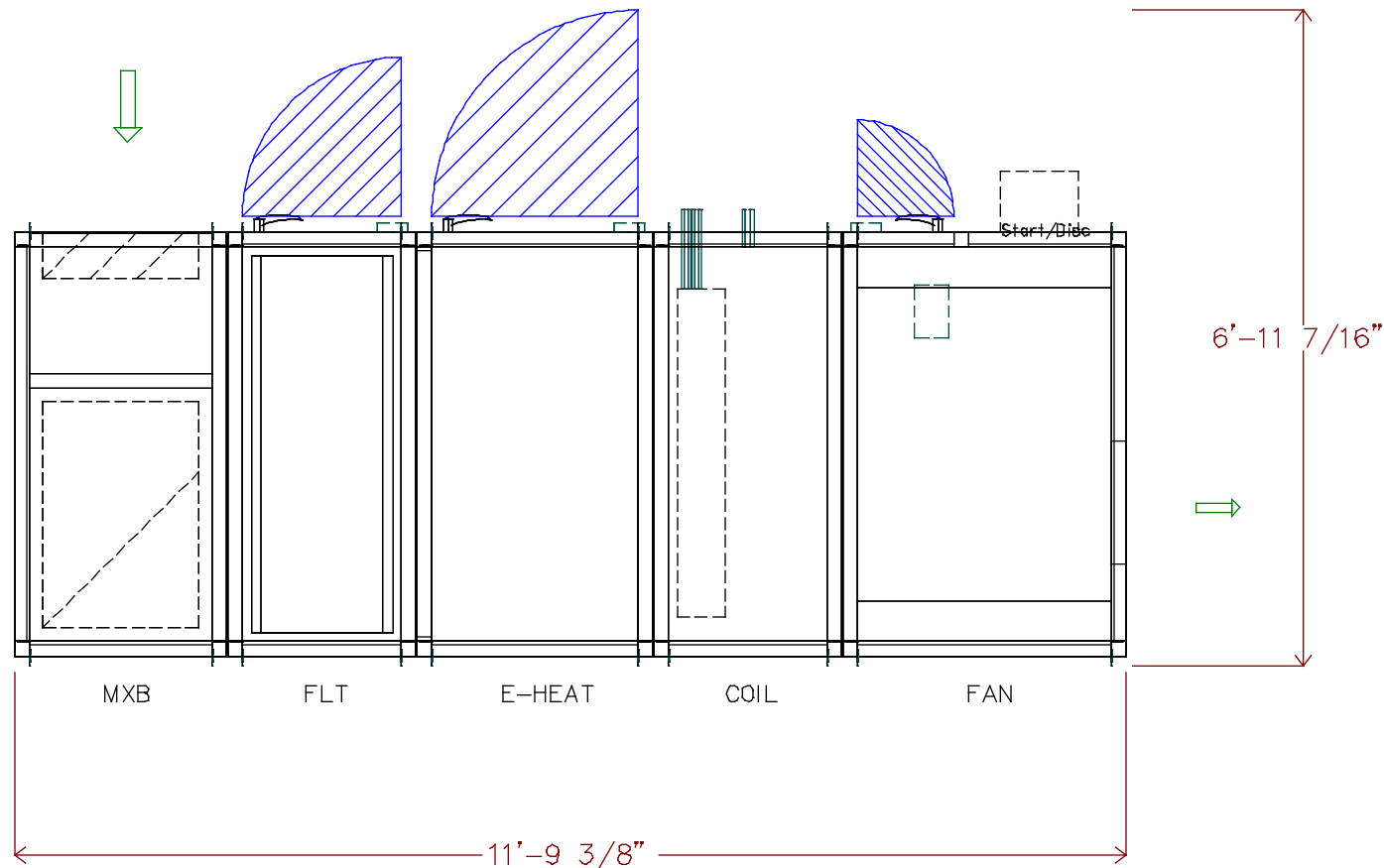
3 HP Premium Efficiency ODP 208-230/460 3Ph 60Hz 1800 RPM  
 Operating weight: 1991.0 lbs.  
 Upstream Corner Weight (each): 425.0 lbs.  
 Downstream Corner Weight (each): 570.0 lbs.



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v6.34 02/11/14

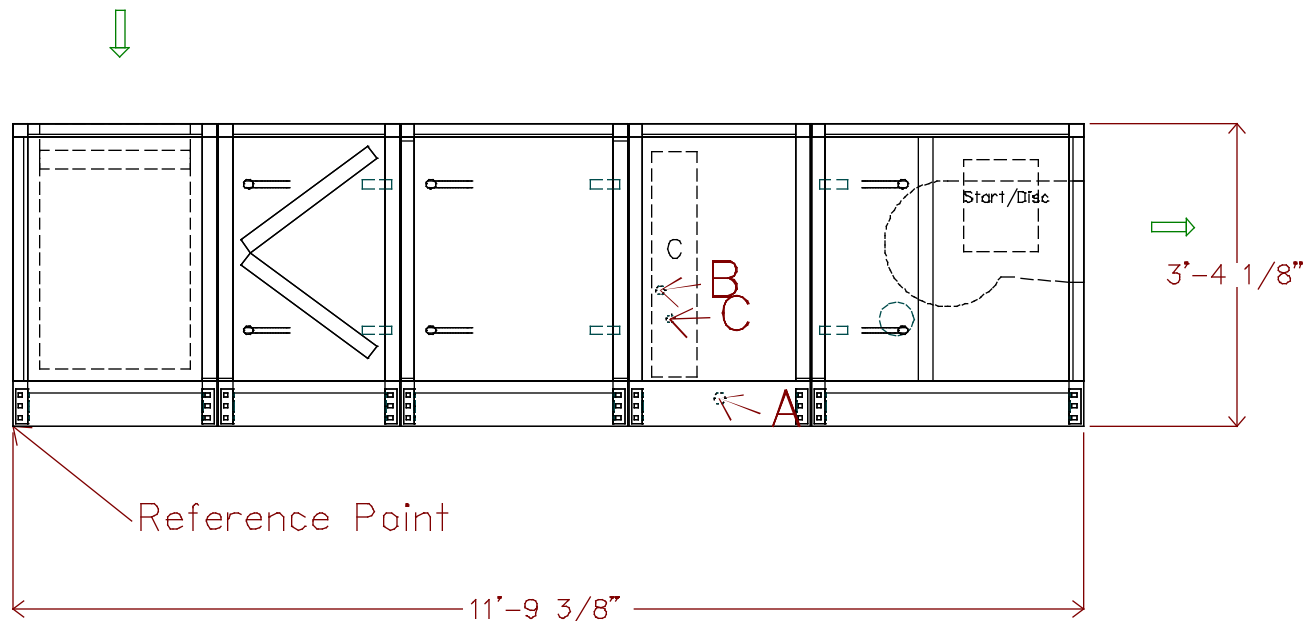
39M Central Station Air-Handler, Size 08  
 St Michael Archangel Church: AHU-5  
 Assembly Drawing

REVISION  
  
Top View



Direct Expansion 4 Row 14 FPI Intertwined 1/2Circuit (qty. 1)  
 2 @ 0.875" diameter distributor(s)

Pipe	x	y	diameter	Usage
A	7'-9 5/16"	3 13/16"	1 1/2"	DrainPan
B	7'-1 7/16"	1'-6"	1 1/8"	Suction
C	7'-2 3/4"	1'-2 1/4"	1 1/8"	Suction



DATE  
 5/30/2014

Configurator Ver.  
 v6.34 02/11/14

39M Central Station Air-Handler, Size 08  
 St Michael Archangel Church: AHU-5  
 Assembly Drawing

REVISION  
 Side View

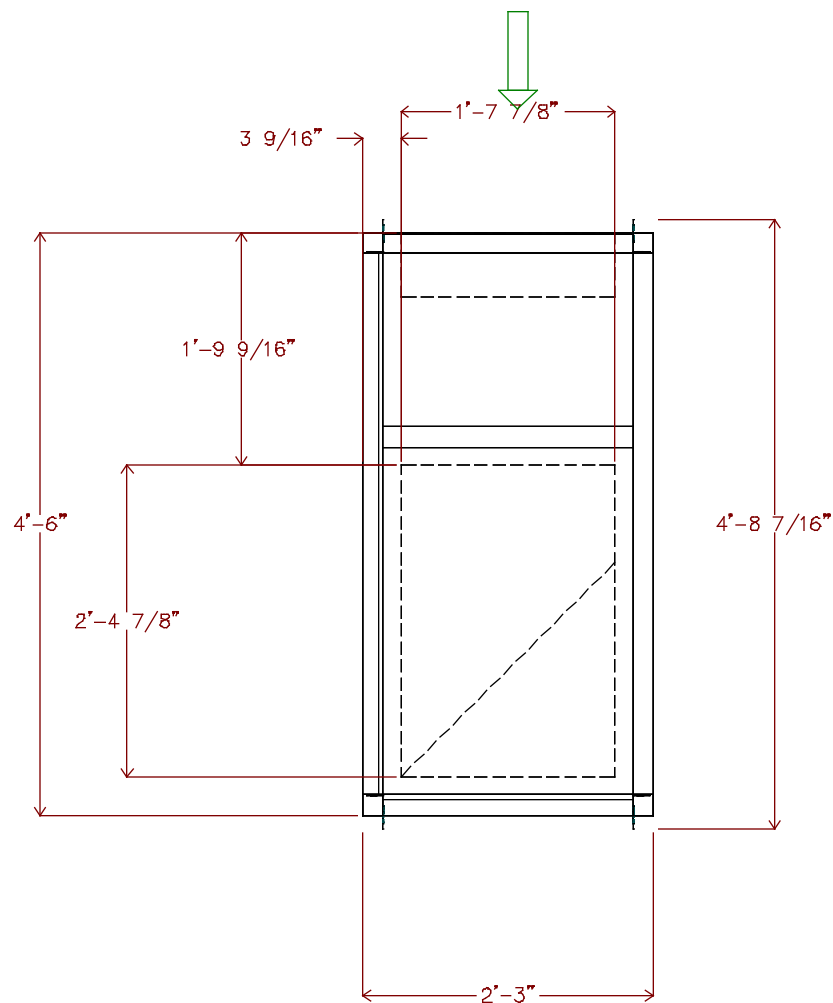


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DATE  
5/30/2014

Configurator Ver.  
v6.34 02/11/14

39M Central Station Air-Handler, Size 08  
St Michael Archangel Church: AHU-5  
Mixing Box

REVISION  
Top View

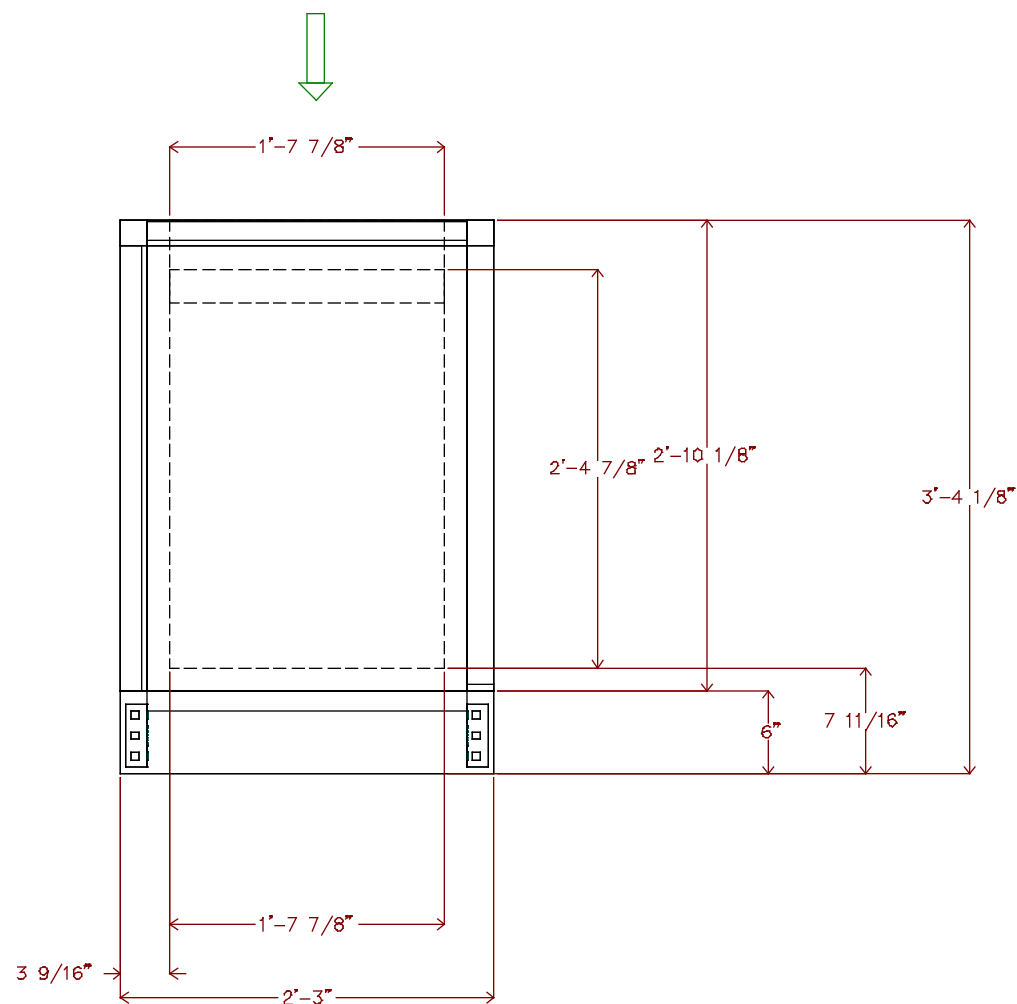


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DATE  
5/30/2014

Configurator Ver.  
v6.34 02/11/14

39M Central Station Air-Handler, Size 08  
St Michael Archangel Church: AHU-5  
Mixing Box

REVISION  
Side View



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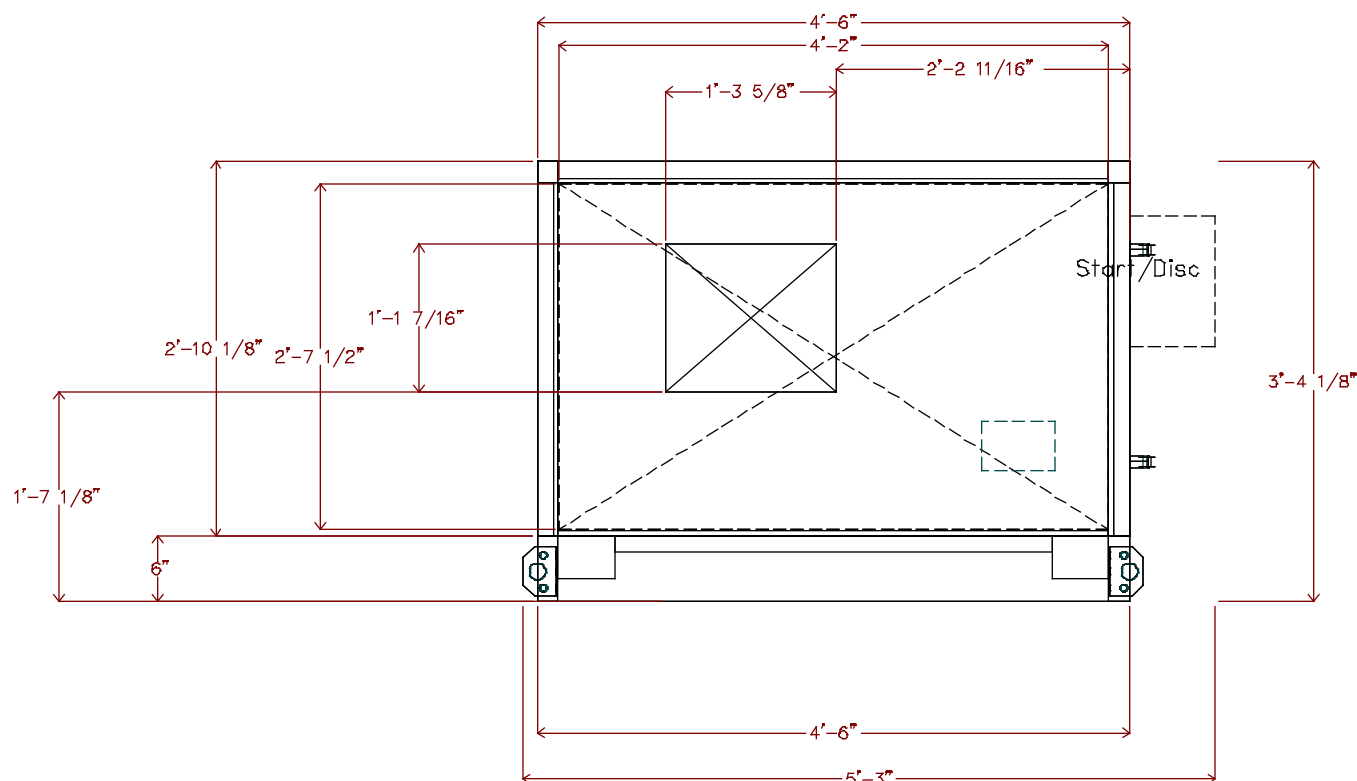
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Unit viewed from right side of side elevation view.

Draw-Thru Supply Fan

3 HP Premium Efficiency ODP 208-230/460 3Ph 60Hz 1800 RPM



DATE  
5/30/2014

Configurator Ver.  
v6.34 02/11/14

39M Central Station Air-Handler, Size 08  
St Michael Archangel Church: AHU-5  
Draw-Thru Supply Fan

REVISION  
End View

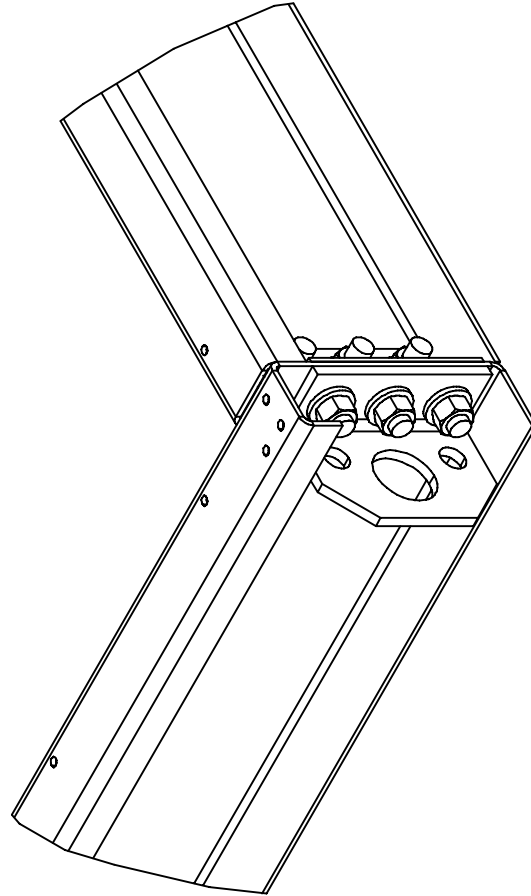
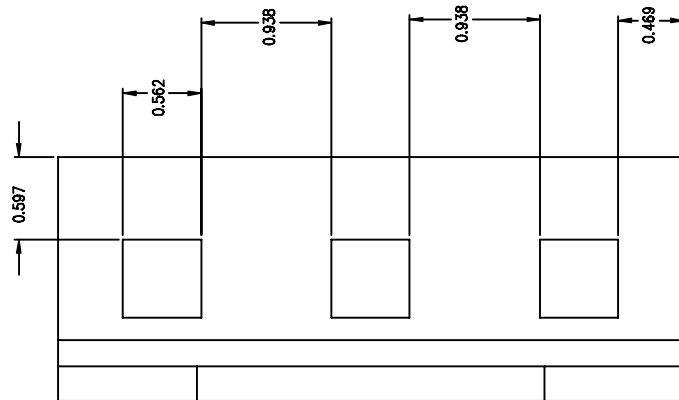
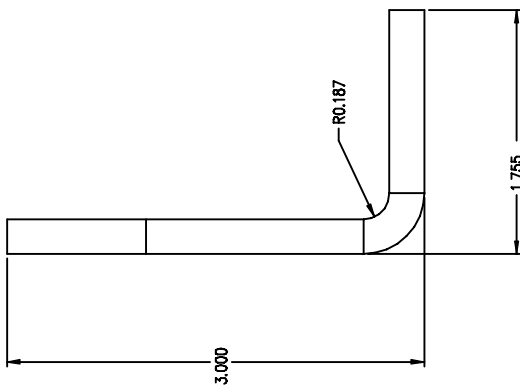
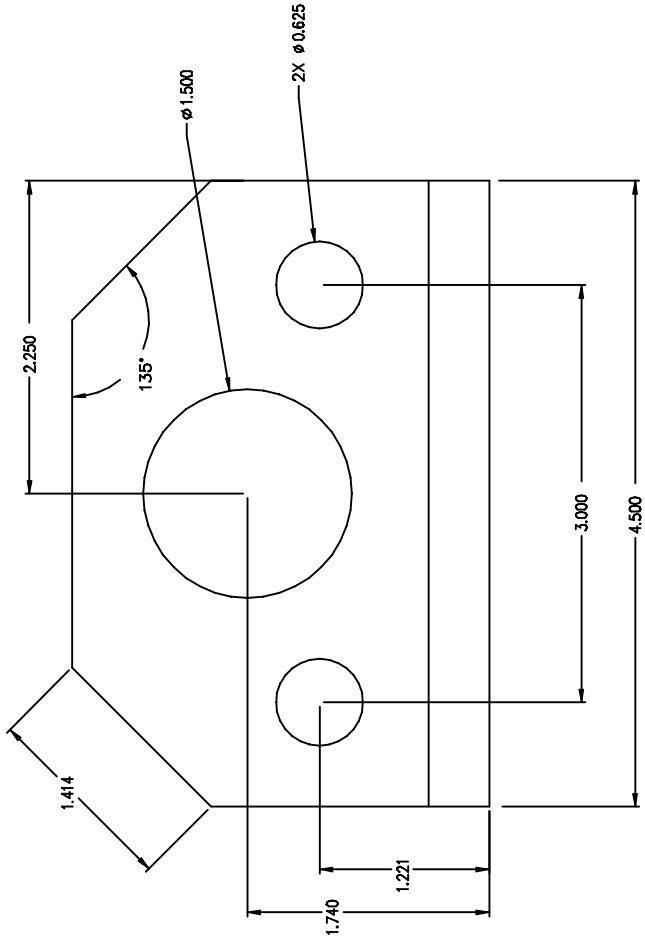


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39MN



REVISION  
39M Central Station Air-Handler, Size: 03 - 110  
6" Base rail and Lifting Lug Detail



Carrier

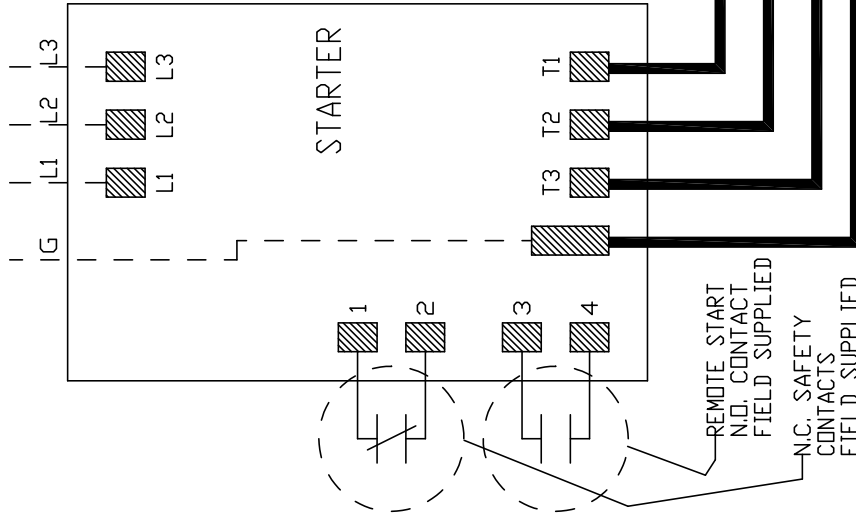
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39M

FIELD SUPPLIED WIRING  
PER "NEC" CODE



WIRING DIAGRAM  
STARTER  
3 PHASE

MOTOR

YELLOW  
BLUE  
BLACK

GREEN OR BARE COPPER

NOTES:

- 1) MOTOR CONNECTIONS L4 THRU L9 NOT SHOWN. CONNECT PER MOTOR MANUFACTURERS RECOMMENDATIONS AND SPECIFIED OPERATING VOLTAGE.
- 2) CHECK FOR CORRECT MOTOR ROTATION AFTER WIRING. TO REVERSE MOTOR ROTATION, REVERSE FIELD LINE VOLTAGE WIRING ON TERMINALS L1 AND L2.
- 3) REMOVE FACTORY INSTALLED JUMPER WIRE BETWEEN TERMINALS 1 AND 2 BEFORE CONNECTING SAFETY CONTACT (LTT/HPS).
- 4) FIELD WIRING MUST BE IN ACCORDANCE WITH "NEC" CODE AND LOCAL CODE REQUIREMENTS. REFER TO INSTALLATION INSTRUCTION FOR MINIMUM WIRE GAUGE REQUIREMENTS.
- 5) ALL FACTORY WIRING IS RATED FOR 90 DEGREES C, TYPE THHN. REPLACE WITH SAME SIZE AND TYPE AS ORIGINALLY SUPPLIED.

39MA51003756 -

REVISION

39M Central Station Air-Handler, Size: 03 - 61

Three Phase Starter Wiring Detail

## Air Filter Submittal

Project: Untitled  
Unit Tag: AHU-5

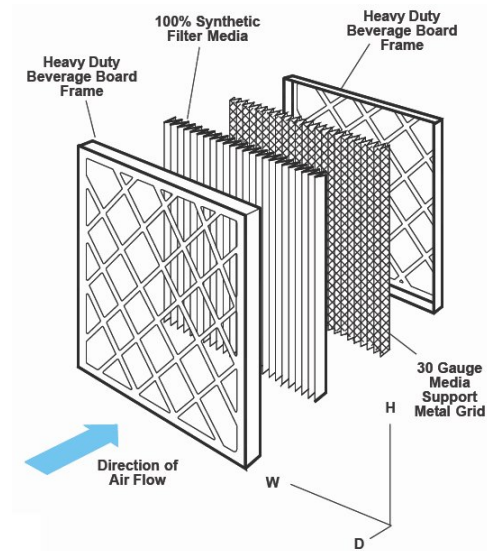
Carrier Part Number .....	31KFG39MD008822
Kit Description .....	Filter Kit, 2" ANG/FMB Pleated (MERV13), 39M008
Unit Airflow, CFM .....	3400
Filter Velocity, FPM .....	306
Filter Sizes and Quantities .....	Qty (4) 16in. x 25in.

## Quality Pleat

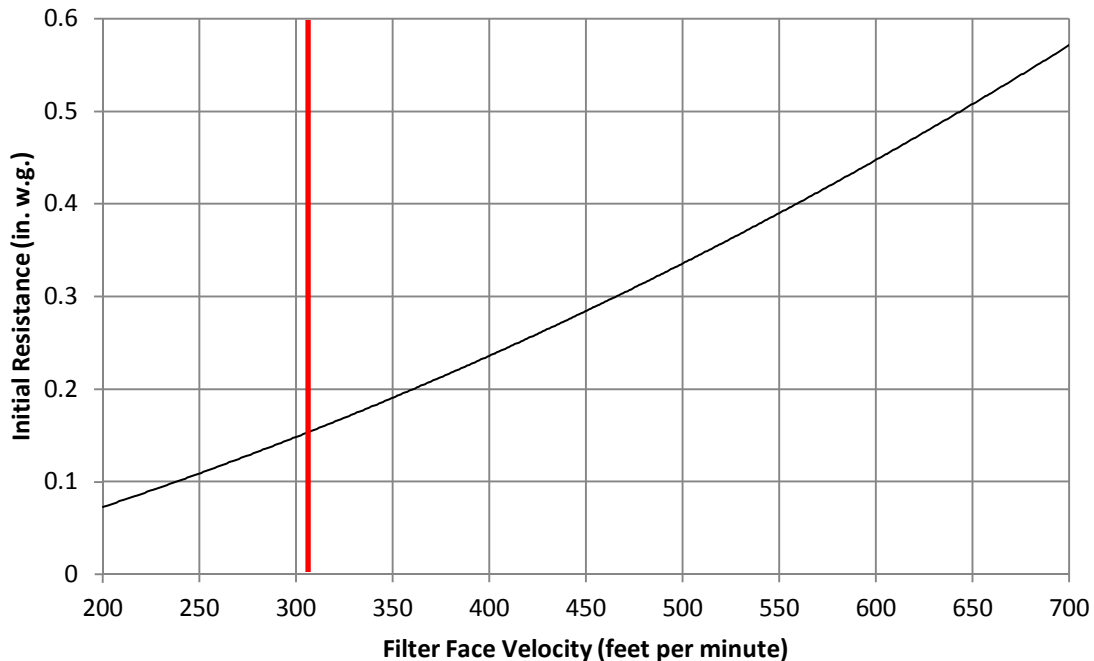
### MERV 13 Pleated Filter

The 100% synthetic graduated density media is continuously bonded to a 30 gauge galvanized, corrosion resistant, expanded metal support grid with an effective open area of 96%. The media is resistant to a wide range of chemicals, does not absorb moisture and will not support microbial growth.

The controlled pleat spacing maximizes surface area and dust holding capacity and is bonded to the enclosure frame to prevent dust bypass. The enclosure frame is constructed of high wet strength moisture resistant beverage board. The diagonal support members of the frame are bonded to the entering and exiting apexes of each pleat to prevent pleat collapse and filter bowing.



### Filter Pleated (2") MERV 13



## Unit Report For CU 3-5

Project: ~Untitled65  
Prepared By:

05/30/2014  
03:47PM



### Outdoor Unit Parameters

Unit Quantity:.....1  
Unit Model:.....38AUD  
Unit Size:.....10 Tons  
Voltage:.....460-3-60 V-Ph-Hz  
Condenser Coil:.....Al/Cu

### System Parameter

System Quantity:.....3  
Refrigerant Type:.....PURON  
Compressor Quantity:.....2  
Compressor Type:.....Scroll  
Std. Capacity Steps:.....50, 100  
Std. Min. Outdoor Temp(Cooling):.....-20.0 °F  
No. of Outdoor fans:.....2

### Outdoor Unit Dimensions and Weight

Unit Length:.....4' 11.4"  
Unit Width:.....3' 9.9"  
Unit Height:.....4' 2.4"  
Unit Shipping Weight:.....516 lb  
Unit Operating Weight:.....499 lb

### Accessories and Installed Options

Low ambient FIOP operation down to -20 F.

### Warranty Information (Note: for US & Canada only)

**NOTE:** Please see Warranty Catalog 808-218 for explanation of policies and ordering methods.

### Ordering Information

Part Number	Description	Quantity
<b>Base Unit - Outdoor</b>		
38AUDB12A0A6-0A0A0		3
	Base Unit	
	Al/Cu Condensing Coil	3
	Low Ambient Controls Refrigerant Options	3
	Service Options - None	3
	Electrical Options - None	3
	Packaging Options - Standard	3
	Standard Electrical Mechanical Controls	3
<b>Accessories</b>		
CALVHLGD011A00	Louvered Condenser Coil Hail Guard for Outdoor Unit	3
EF680033	Liquid Line Solenoid Valve for Outdoor Unit	6
EF680037	Liquid Line Solenoid Valve for Outdoor Unit	6
KM680008	Sight Glass for Outdoor Unit	6



## Performance Summary For CU 3-5

Project: ~Untitled65  
Prepared By:

05/30/2014  
03:47PM

**System:** .....38AUD012  
 System Quantity: .....3  
 Altitude: .....0.0 ft  
 EER @ ARI Conditions: .....13.0  
 IPLV: .....NA  
 Suction Line Loss: .....1.4 °F  
 System meets ASHRAE 90.1 min EER requirement.

### Liquid and Suction Line Sizing

Pipe Length	Liquid Line Size	Suction Line Size
0 - 25	3/8	7/8
26 - 50	3/8	7/8
51 - 75	3/8	1 1/8
76 - 100	1/2	1 1/8
101 - 125	1/2	1 1/8

### Outdoor Unit Parameters

Unit Quantity: .....1  
 PartNumber: .....38AUDB12A0A6-0A0A0  
 Unit Model: .....38AUD  
 Unit Size: .....10 Tons  
 Condenser Coil: .....Al/Cu  
 Voltage: .....460-3-60 V-Ph-Hz  
 Total Clg Cap.(Gross): .....111.8 MBH  
 SDT: .....117.9 °F  
 Clg Ent Air DB: .....95.0 °F  
 Saturated Suction Temp: .....45.0 °F

### Outdoor Electrical Data

Unit Voltage: .....460-3-60 V-Ph-Hz  
 Unit#1 MCA: .....18.9 Amps  
 Unit#1 MOCB: .....25.0 Amps  
 Total Compressor Power of Unit #1: .....8.40 kW  
 Voltage Range Min: .....414 V  
 Voltage Range Max: .....506 V  
 Compressor RLA: .....7.7  
 Compressor LRA: .....52  
 Compressor Quantity: .....2  
 Fan Motors Qty: .....2

Notice: Outdoor unit elect. data is based on 460-3-60  
 Control Panel SCCR: 5kA RMS at Rated Symmetrical Voltage

### Acoustics

Sound Power Levels, db re 10E-12 Watts

	Outdoor Unit (dB)	Indoor Unit (dB,Ducted)
A-Weighted Total Level	84.2	NA
63Hz	86.3	NA
125Hz	85.8	NA
250Hz	81.4	NA
500Hz	81.9	NA
1000Hz	79.5	NA
2000Hz	75.1	NA
4000Hz	71.9	NA
8000Hz	68.9	NA
Sound Message	Sound for AUD012	

## Performance Summary For CU 3-5

Project: ~Untitled65  
Prepared By:

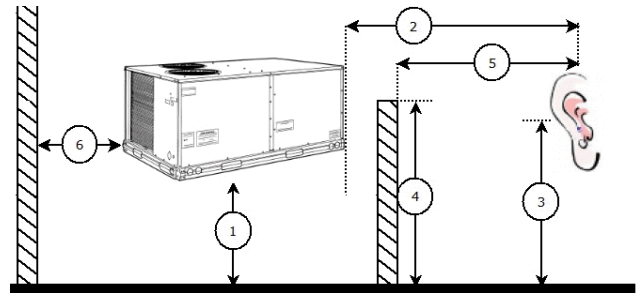
05/30/2014  
03:47PM

### Acoustic Note:

1. 38AUZ and 38AUD sound power data is tested in accordance with ARI270-95 Sound Rating of Unitary Equipment.
2. The indoor duct sound power data is estimated based on the ASHRAE calculation approach from the ASHRAE handbook 1987 HVAC Systems & Applications, Chapter 52.
3. The acoustic center of the unit is located at the geometric center of the unit.
4. All estimated sound power levels, dB re 1 Picowatt should not be guaranteed or certified as being the actual sound power levels.

### Advanced Acoustics Parameters

1. Unit height above ground:..... **1.0** ft
2. Horizontal distance from unit to receiver:..... **20.0** ft
3. Receiver height above ground:..... **5.7** ft
4. Height of obstruction:..... **0.0** ft
5. Horizontal dist. from obstruction to receiver:..... **0.0** ft
6. Horizontal dist. from unit to obstruction:..... **0.0** ft



### Detailed Acoustics Information

Octave Band Center Frequency, Hz	63	125	250	500	1k	2k	4k	8k	Overall
Sound Power Levels at Unit's Acoustic Center (Lw), dB	86.3	85.8	81.4	81.9	79.5	75.1	71.9	68.9	90.9
A-Wgtd Sound Power Levels at Unit's Acoustic Center (LwA), dBA	60.1	69.7	72.8	78.7	79.5	76.3	72.9	67.8	84.2
Sound Press. Levels at Dist. Specified above (Lp), dB	62.0	61.5	57.1	57.6	55.2	50.8	47.6	44.6	66.6
A-Wgtd Sound Press. Levels at Dist. Specified above (LpA), dBA	35.8	45.4	48.5	54.4	55.2	52.0	48.6	43.5	59.8

Calculation methods used in this program are patterned after the ASHRAE Guide; other ASHRAE Publications and the AHRI Acoustical Standards. While a very significant effort has been made to insure the technical accuracy of this program, it is assumed that the user is knowledgeable in the art of system sound estimation and is aware of the tolerances involved in real world acoustical estimation. This program makes certain assumptions as to the dominant sound sources and sound paths which may not always be appropriate to the real system being estimated. Because of this, no assurances can be offered that this software will always generate an accurate sound prediction from user supplied input data. If in doubt about the estimation of expected sound levels in a space, an Acoustical Engineer or a person with sound prediction expertise should be consulted.

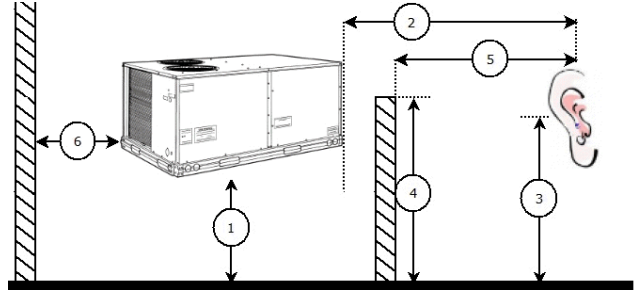
## Acoustic Summary For CU 3-5

Project: ~Untitled65  
Prepared By:

05/30/2014  
03:47PM

### Outdoor Unit Parameters:

Tag Name:..... **CU 3-5**  
Unit Model:..... **38AUD**  
Unit Size:..... **10 Tons**  
System Type:..... **Dx Cooling Only**  
Refrigerant Type:..... **PURON**  
Compressor Quantity:..... **2**  
Compressor Type:..... **Scroll**



### Advanced Acoustics Parameters

1. Unit height above ground:..... **1.0** ft  
2. Horizontal distance from unit to receiver:..... **20.0** ft  
3. Receiver height above ground:..... **5.7** ft  
4. Height of obstruction:..... **0.0** ft  
5. Horizontal distance from obstruction to receiver:..... **0.0** ft  
6. Horizontal distance from unit to obstruction:..... **0.0** ft

### Detailed Acoustics Information

Octave Band Center Frequency, Hz	63	125	250	500	1k	2k	4k	8k	Overall
Sound Power Levels at Unit's Acoustic Center (Lw), dB	86.3	85.8	81.4	81.9	79.5	75.1	71.9	68.9	90.9
A-Wgtd Sound Power Levels at Unit's Acoustic Center (LwA), dBA	60.1	69.7	72.8	78.7	79.5	76.3	72.9	67.8	84.2
Sound Press. Levels at Dist. Specified above (Lp), dB	62.0	61.5	57.1	57.6	55.2	50.8	47.6	44.6	66.6
A-Wgtd Sound Press. Levels at Dist. Specified above (LpA), dBA	35.8	45.4	48.5	54.4	55.2	52.0	48.6	43.5	59.8

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### Acoustic Note:

1. 38ARZ, 38ARS and 38ARD012 sound power data is tested in accordance with ARI270-95 Sound Rating of Unitary Equipment.
2. 38ARD014-024 and 38AKS data is estimated sound power levels. It is based upon a limited amount of actual testing with the estimated sound power data being generated from this data in accordance with ARI Standard 370 for large outdoor refrigerating and air-conditioning equipment.
3. The indoor duct sound power data is estimated based on the ASHRAE calculation approach from the ASHRAE handbook 1987 HVAC Systems & Applications, Chapter 52.
4. The acoustic center of the unit is located at the geometric center of the unit.
5. All estimated sound power levels, dB re 1 Picowatt should not be guaranteed or certified as being the actual sound power levels.

# Certified Drawing for CU 3-5

Project: ~Untitled65  
Prepared By:

05/30/2014  
03:47PM

UNIT	ELECTRICAL CHARACTERISTICS	STD. UNIT WT.		CORNER A		CORNER B		CORNER C		CORNER D		CENTER OF GRAVITY			UNIT HEIGHT
		LBS.	KG.	LBS.	KG.	LBS.	KG.	LBS.	KG.	LBS.	KG.	X	Y	Z	
38AUZ-07	208/230-3-60,460-3-60,575-3-60	328	149	128	58	68	31	62	28	70	32	21 (533.4)	19 (482.6)	13 (330.2)	42-3/8 (1076.0)
38AUZ-08	208/230-3-60,460-3-60,575-3-60	353	160	138	63	72	33	65	29	78	35	19 (482.6)	23 (584.2)	13 (330.2)	42-3/8 (1076.0)
38AUZ-12	208/230-3-60,460-3-60,575-3-60	418	190	165	75	85	39	78	35	90	41	23 (584.2)	20 (508.0)	15 (381.0)	50-3/8 (1279.2)
38AUZ-14	208/230-3-60,460-3-60,575-3-60	431	196	162	73	82	37	92	42	95	43	19 (482.6)	23 (584.2)	15 (381.0)	50-3/8 (1279.2)
38AUD-12	208/230-3-60,460-3-60,575-3-60	499	226	193	88	111	50	72	38	123	56	20 (508.0)	23 (584.2)	15 (381.0)	50-3/8 (1279.2)
38AUD-14	208/230-3-60,460-3-60,575-3-60	505	229	190	86	88	40	76	34	151	68	20 (508.0)	24 (609.6)	15 (381.0)	50-3/8 (1279.2)
38AU0-07	208/230-3-60,460-3-60,575-3-60	444	201	164	74	69	31	114	52	97	44	23 (584.2)	26 (660.4)	13 (330.2)	42-3/8 (1076.0)
38AU0-08	208/230-3-60,460-3-60,575-3-60	485	220	140	64	130	59	85	39	130	59	20 (508.0)	24 (609.6)	13 (330.2)	42-3/8 (1076.0)
38AU0-12	208/230-3-60,460-3-60,575-3-60	527	239	151	68	141	64	94	43	141	64	21 (533.4)	24 (609.6)	15 (381.0)	50-3/8 (1279.2)



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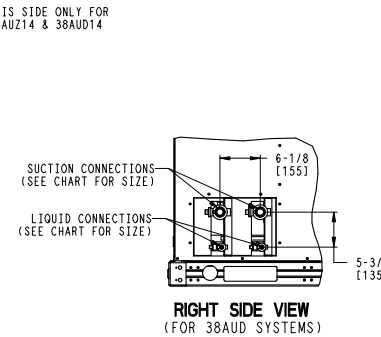
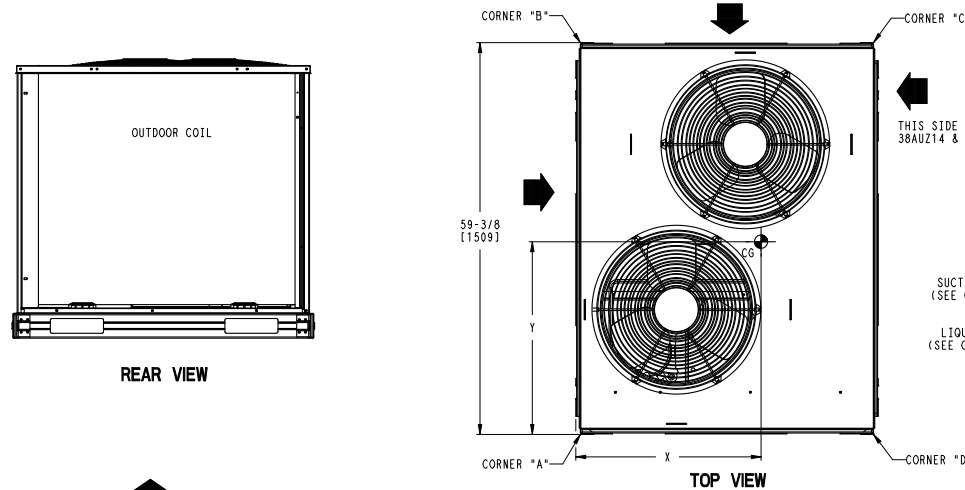
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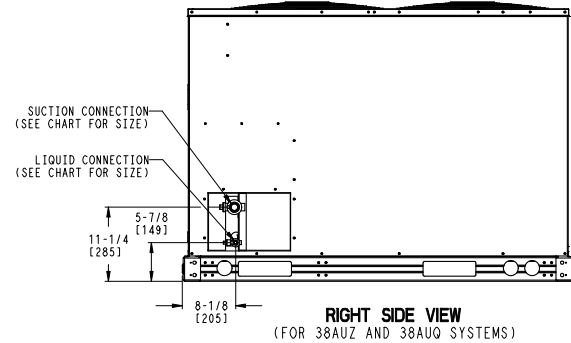
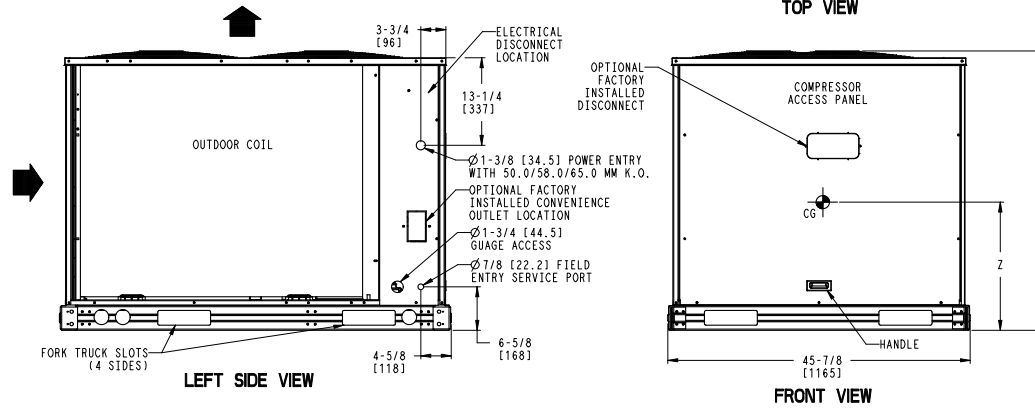
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- NOTES:
- MINIMUM CLEARANCE (LOCAL CODES OR JURISDICTION MAY PREVAIL):
    - BOTTOM TO COMBUSTIBLE SURFACES: 0 INCHES.
    - OUTDOOR COIL, FOR PROPER AIR FLOW: 36 INCHES ONE SIDE, 12 INCHES THE OTHER. THE SIDE GETTING THE GREATER CLEARANCE IS OPTIONAL.
    - OVERHEAD: 60 INCHES, TO ASSURE PROPER OUTDOOR FAN OPERATION.
    - BETWEEN UNITS: CONTROL BOX SIDE, 42 INCHES PER NEC.
    - BETWEEN UNIT AND UNGROUNDED SURFACES: CONTROL BOX SIDE, 36 INCHES PER NEC.
    - BETWEEN UNIT AND BLOCK OR CONCRETE WALLS AND OTHER GROUNDED SURFACES: CONTROL BOX SIDE, 42 INCHES PER NEC.
  - WITH EXCEPTION OF THE CLEARANCE FOR THE OUTDOOR COIL AS STATED IN NOTE 1B, A REMOVABLE FENCE OR BARRICADE REQUIRES NO CLEARANCE.
  - UNITS MAY BE INSTALLED ON COMBUSTIBLE FLOORS MADE FROM WOOD OR CLASS A, B OR C ROOF COVERING MATERIAL.

SERVICE VALVE CONNECTIONS		
UNIT	SUCTION	LIQUID
38AUZ07	1-1/8 (28.6)	3/8 (9.5)
38AUZ08	1-1/8 (28.6)	1/2 (12.7)
38AUZ12	1-3/8 (34.9)	1/2 (12.7)
38AUZ14	1-3/8 (34.9)	5/8 (15.9)
38AUD12	1-1/8 (28.6)	3/8 (9.5)
38AUD14	1-3/8 (34.9)	1/2 (12.7)
38AU007	1-1/8 (28.6)	3/8 (9.5)
38AU008	1-1/8 (28.6)	1/2 (12.7)
38AU012	1-3/8 (34.9)	1/2 (12.7)



CG CENTER OF GRAVITY  
DIRECTION OF AIR FLOW  
DIMENSIONS IN [ ] ARE IN MM



DATE	SUPERCEDES	CONDENSING UNIT	REV
02/17/09	12/30/08	38AUZ / 38AUD / 38AU0 - 07/08/12/14	3.0

## GUIDE SPECIFICATIONS

### Commercial Air-Cooled Condensing Units

#### HVAC Guide Specifications

Size Range: **6 to 20 Tons, Nominal**

Carrier Model Numbers: **38AUZ, Single Circuit (07 - 25 Models) 38AUD, Dual Circuit (12 - 25 Models)**

#### Part 1 — General

##### 1.01 SYSTEM DESCRIPTION

Outdoor-mounted, air-cooled condensing unit suitable for on-the-ground or rooftop installation. Unit shall consist of a hermetic scroll air-conditioning compressor(s) assembly, an air-cooled coil, propeller-type condenser fans, and a control box. Unit shall discharge supply air upward as shown on contract drawings. Unit shall be used in a refrigeration circuit matched with a packaged air-handling unit.

##### 1.02 QUALITY ASSURANCE

- A. Unit shall be rated in accordance with AHRI Standard 360.
- B. Unit construction shall comply with ANSI/ASHRAE 15 safety code latest revision and comply with NEC.
- C. Unit shall be constructed in accordance with UL 1995 standard and shall carry the UL and UL, Canada label.
- D. Unit cabinet shall be capable of withstanding 500-hour salt spray exposure per ASTM B117 (scribed specimen).
- E. Air-cooled condenser coils for hermetic scroll compressor units (38AUZ) and 38AUD shall be leak tested at 150 psig, and pressure tested at 650 psig.
- F. Unit shall be manufactured in a facility registered to ISO 9001:2000 manufacturing quality standard.

##### 1.03 DELIVERY, STORAGE, AND HANDLING

Unit shall be shipped as single package only, and shall be stored and handled according to unit manufacturer's recommendations.

##### 1.04 WARRANTY (FOR INCLUSION BY SPECIFYING ENGINEER.)

#### Part 2 — Products

##### 2.01 EQUIPMENT

###### A. General:

Factory-assembled, single piece, air-cooled condensing unit. Contained within the unit enclosure shall be all factory wiring, piping, controls, compressor, holding charge, and special features required prior to field start-up.

###### B. Unit Cabinet:

- 1. Unit cabinet shall be constructed of galvanized steel, bonderized and coated with a prepainted baked enamel finish.
- 2. A heavy-gauge roll-formed perimeter base rail with forklift slots and lifting holes shall be provided to facilitate rigging.

###### C. Condenser Fans:

- 1. Condenser fans shall be direct driven, propeller type, discharging air vertically upward.
- 2. Fan blades shall be balanced.
- 3. Condenser fan discharge openings shall be equipped with PVC-coated steel wire safety guards.
- 4. Condenser fan and motor shaft shall be corrosion resistant.

###### D. Compressor:

- 1. Compressor shall be of the hermetic scroll type .
- 2. Compressor shall be mounted on rubber grommets.
- 3. Compressors shall include overload protection.
- 4. Compressors shall be equipped with a crankcase heater.
- 5. Compressor shall be equipped with internal high pressure and high temperature protection.
- 6. 38AUZ\*16 and 25 sizes shall use two scroll compressors manifold together.

###### E. Condenser Coils:

- 1. Standard Aluminum fin - Copper Tube Coils:

- a. Standard evaporator and condenser coils shall have aluminum lanced plate fins mechanically bonded to seamless internally grooved copper tubes with all joints brazed.
- b. Evaporator coils shall be leak tested to 150 psig, pressure tested to 450 psig, and qualified to UL 1995 burst test at 1775 psig.
- c. Condenser coils shall be leak tested to 150 psig, pressure tested to 650 psig, and qualified to UL 1995 burst test at 1980 psig.
2. Optional Pre-coated aluminum-fin condenser coils:
  - a. Shall have a durable epoxy-phenolic coating to provide protection in mildly corrosive coastal environments.
  - b. Coating shall be applied to the aluminum fin stock prior to the fin stamping process to create an inert barrier between the aluminum fin and copper tube.
  - c. Epoxy-phenolic barrier shall minimize galvanic action between dissimilar metals.
3. Optional Copper-fin evaporator and condenser coils:
  - a. Shall be constructed of copper fins mechanically bonded to copper tubes and copper tube sheets.
  - b. Galvanized steel tube sheets shall not be acceptable.
  - c. A polymer strip shall prevent coil assembly from contacting the sheet metal coil pan to minimize potential for galvanic corrosion between coil and pan.
4. Optional E-coated aluminum-fin evaporator and condenser coils:
  - a. Shall have a flexible epoxy polymer coating uniformly applied to all coil surface areas without material bridging between fins.
  - b. Coating process shall ensure complete coil encapsulation of tubes, fins and headers.
  - c. Color shall be high gloss black with gloss per ASTM D523-89.
  - d. Uniform dry film thickness from 0.8 to 1.2 mil on all surface areas including fin edges.
  - e. Superior hardness characteristics of 2H per ASTM D3363-92A and cross-hatch adhesion of 4B-5B per ASTM D3359-93.
  - f. Impact resistance shall be up to 160 in.-lb (ASTM D2794-93).
  - g. Humidity and water immersion resistance shall be up to minimum 1000 and 250 hours respectively (ASTM D2247-92 and ASTM D870-92).
  - h. Corrosion durability shall be confirmed through testing to be no less than 1000 hours salt spray per ASTM B117-90.
5. Standard All Aluminum Novation Coils:
  - a. Standard condenser coils shall have all aluminum Novation Heat Exchanger Technology design consisting of aluminum multi port flat tube design and aluminum fin. Coils shall be a furnace brazed design and contain epoxy lined shrink wrap on all aluminum to copper connections.
  - b. Condenser coils shall be leak tested to 150 psig, pressure tested to 650 psig, and qualified to UL 1995 burst test at 1980 psig.
6. Optional E-coated aluminum-fin, aluminum tube condenser coils:
  - a. Shall have a flexible epoxy polymer coating uniformly applied to all coil external surface areas without material bridging between fins or louvers.
  - b. Coating process shall ensure complete coil encapsulation, including all exposed fin edges.
  - c. E-coat thickness of 0.8 to 1.2 mil with top coat having a uniform dry film thickness from 1.0 to 2.0 mil on all external coil surface areas, including fin edges, shall be provided.
  - d. Shall have superior hardness characteristics of 2H per ASTM D3363-00 and cross-hatch adhesion of 4B-5B per ASTM D3359-02.
  - e. Shall have superior impact resistance with no cracking, chipping or peeling per NSF/ANSI 51-2002 Method 10.2.

#### F. Refrigeration Components:

Refrigeration circuit components shall include liquid line service valve, suction line service valve, a full charge of compressor oil, and a partial holding charge of refrigerant.

## Guide Specification for CU 3-5

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### G. Controls and Safeties:

#### 1. Minimum control functions shall include:

- a. Control wire terminal blocks.
- b. Compressor lockout on auto-reset safety until reset from thermostat.
- c. Each unit shall utilize the Comfort Alertt Diagnostic Board that provides:
  - (1.) System Pressure Trip fault code indication
  - (2.) Short Cycling fault code indication
  - (3.) Locked Rotor fault code indication
  - (4.) Open Circuit fault code indication
  - (5.) Reverse Phase 3 fault code indication
  - (6.) Welded Contactor fault code indication
  - (7.) Low Voltage fault code indication
  - (8.) Anti-short cycle protection
  - (9.) Phase reversal protection

#### 2. Minimum safety devices which are equipped with automatic reset (after resetting first at thermostat), shall include:

- a. High discharge pressure cutout.
- b. Low pressure cutout.

### H. Operating Characteristics:

1. The capacity of the condensing unit shall meet or exceed \_\_\_\_\_ Btuh at a suction temperature of \_\_\_\_\_F. The power consumption at full load shall not exceed \_\_\_\_\_ kW.
2. The combination of the condensing unit and the evaporator or fan coil unit shall have a total net cooling capacity of \_\_\_\_\_ Btuh or greater at conditions of \_\_\_\_\_ cfm entering-air temperature at the evaporator at \_\_\_\_\_F wet bulb and \_\_\_\_\_F dry bulb, and air entering the condensing unit at \_\_\_\_\_F.
3. The system shall have an EER of \_\_\_\_\_ Btuh/Watt or greater at standard AHRI conditions.
4. Standard unit shall be capable to operate up to 125\_F (52\_C) and down to 40\_F (4\_C)

### I. Electrical Requirements:

1. Nominal unit electrical characteristics shall be \_\_\_\_\_ v, 3-ph, 60 Hz. The unit shall be capable of satisfactory operation within voltage limits of \_\_\_\_\_ v to \_\_\_\_\_ v.
2. Unit electrical power shall be single-point connection.
3. Unit control circuit shall contain a 24-v transformer for unit control.

### J. Special Features:

1. Low-Ambient Temperature Control:  
A low-ambient temperature control shall be available as a factory-installed option or as a field-installed accessory. This low-ambient control shall regulate speed of the condenser-fan motors in response to the saturated condensing temperature of the unit. The control shall maintain correct condensing pressure at outdoor temperatures down to -20\_F (-29\_C).

2. Unit-Mounted, Non-Fused Disconnect Switch:  
Switch shall be factory-installed and internally mounted. NEC and UL-approved non-fused switch shall provide unit power shutoff. Switch shall be accessible from outside the unit and shall provide power off lockout capability. Non-fused disconnect switch cannot be used when unit MOCP electrical rating exceeds 80 amps.

3. Convenience Outlet:  
Outlet shall be factory-installed and internally mounted with easily accessible 115-v female receptacle. Outlet shall include 15 amp GFI (ground fault interrupter) receptacle with independent fuse protection. Voltage required to operate convenience outlet shall be provided by a factory-installed step-down transformer. Outlet shall be accessible from outside the unit.

#### 4. Thermostat Controls:

- a. Programmable multi-stage thermostat shall have 7-day clock, holiday scheduling, large backlit display, remote sensor capability, and Title 24 compliance.
- b. Commercial Electronic Thermostat shall have 7-day time clock, auto-changeover, multi-stage capability, and large LCD (liquid crystal display) temperature display.

5. Louvered hail Guard Package:  
Louvered hail guard package shall protect coils against damage from hail and other flying debris.

6. Condenser Coil Grille (Novation coil models 07-14):  
Grille shall add decorative appearance to unit and protect condenser coil from large objects and vandalism.

## Guide Specification for CU 3-5

Project: ~Untitled65  
Prepared By:

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**Catalog No: GS-38AU-04PD**

Replaces: GS-38AU-03PD



## Unit Report For FCU/CU-6

Project: ~Untitled68  
Prepared By:

08/19/2014



### Outdoor Unit Parameters

Unit Model:.....**24ABB**  
Unit Size:.....**4 Tons High Efficiency**  
Voltage:.....**460-3-60** V-Ph-Hz

### Indoor Unit Parameters

Unit Model:.....**FX4D**  
Unit Size:.....**48,000 Btuh**  
Cabinet Insulation:**Single-piece cabinet with 1-in. super thick insulation**  
Voltage:.....**208/230-1-60** V-Ph-Hz  
Heating Size:.....**No Heat**

### Outdoor Unit Dimensions and Weight

Unit Length:.....**33** in  
Unit Width:.....**36** in  
Unit Height:.....**39** in  
Unit Shipping Weight:.....**224** lb

### Indoor Unit Dimensions and Weight

Unit Length:.....**22.06** in  
Unit Width:.....**25** in  
Unit Height:.....**54** in  
Unit Shipping Weight:.....**185** lb

### Warranty Information

#### OTHER RESIDENTIAL APPLICATIONS (Apartments, Rental Properties, etc.)

The warranty period is five (5) years on parts. The warranty is to the original owner only and is not transferable.

#### OTHER APPLICATIONS

The warranty period is five (5) years on the compressor, and one (1) year on all other parts. The warranty is to the original owner only and is not transferable.

### Ordering Information

Part Number	Description	Quantity
<b>Outdoor Unit</b>		
24ABB348A006	24ABB Comfort Series Air Conditioner with Puron Refrigerant 4 Tons Cooling	1
	13 SEER @ ARI Conditions	1
	Dense Grille	1
<b>Accessories</b>		
KAALP0401PUR	Low Pressure Switch	1
KAACH1901AAA		1
KSALA0301410	Low-Ambient Pressure Switch	1
KAAWS0101AAA	Winter Start Control	1
<b>Indoor Unit</b>		
FX4DNF049T00	FX4D Comfort Series Fan Coil with Puron 48000 BTU Cooling	1
	Single-piece cabinet with 1-in. super thick insulation	1
	Armor Coating	1
<b>Accessories</b>		
KFCEH3001F15	15 kW, Electric Heater, Fused, Stageable, with relays	1

## Performance Summary For FCU/CU-6

Project: ~Untitled68  
Prepared By:

08/19/2014

### System Performance

<b>System:</b> .....	<b>24ABB/FX4D</b>	Actual Airflow:.....	<b>1600.0</b>	CFM
System Quantity:.....	<b>1</b>	Standard Airflow:.....	<b>1600.0</b>	CFM
Altitude:.....	<b>0.0</b> ft	Total Net Clg Capacity:.....	<b>46.79</b>	MBH
Linear Pipe Length:.....	<b>0.0</b> ft	Net Sensible Clg Capacity:.....	<b>34.89</b>	MBH
SEER @ ARI Conditions:.....	<b>14.0</b>	Total System Power:.....	<b>3.86</b>	kW
EER @ ARI Conditions:.....	<b>12.0</b>			

### System Parameters

#### Outdoor Unit Parameters

Unit Model:.....**24ABB348A006**  
Unit Size (Nominal):.....**4 Tons High Efficiency**  
Voltage:.....**460-3-60** V-Ph-Hz  
Clg Ent Air DB Ambient:.....**95.0** °F

#### Indoor Unit Parameters

Unit Model:.....**FX4DNF049T00**  
Unit Size (Nominal):.....**48,000 Btuh**  
Voltage:.....**208/230-1-60** V-Ph-Hz  
Ent Air DB:.....**80.70** °F  
Ent Air WB:.....**66.80** °F  
Ent Enthalpy:.....**31.27** BTU/lb  
Lvg Air DB:.....**60.51** °F  
Lvg Air WB:.....**57.61** °F  
Lvg Enthalpy:.....**24.77** BTU/lb  
Heating Size (Nominal):.....**No Heat**  
Indoor Unit External Static:.....**0.50** in wg

### Electrical Data

#### Outdoor Electrical Data

Unit Voltage:.....**460-3-60** V-Ph-Hz  
Fan Motor FLA:.....**0.70** Amps  
MCA:.....**8.3** Amps  
Max Fuse:.....**15** Amps  
Operating Range Min:.....**414** V  
Operating Range Max:.....**506** V  
Compressor RLA:.....**6.1** Amps  
Compressor LRA:.....**41.0** Amps

#### Indoor Electrical Data:

(For units with no factory installed electric heaters)  
Unit Voltage:.....**208/230-1-60** V-Ph-Hz  
Unit FLA:.....**6.0** Amps  
Unit MCA:.....**7.5** Amps  
Unit MOCP:.....**15.0** Amps  
Unit Min Wire Size:.....**14.0**  
Motor HP:.....**3/4** HP  
**Notice: Indoor Elect. data is for 208/230-1-60 voltage**

#### Accessory Electric Heater Data

(Single point power for unit WITH electric heaters)

EH Part Number:.....**KFCEH3001F15**  
Electric Heater kW:.....**15.0** kW

#### For 2 wire operation (single circuit):

Heater Amps:.....**54.2/59.9** Amps  
Heater + Motor MCA:.....**76.3/83.4** Amps  
Heater + Motor MOCP:.....**80/90** Amps

#### For 4 wire operation (dual circuit):

Heater Amps L1/L2:.....**36.2/40.0** Amps  
Heater + Motor MOCP L1/L2:.....**60/60** Amps  
Heater Amps L3/L4:.....**18.1/20.0** Amps  
Heater + Motor MOCP L3/L4:.....**25/25** Amps  
Accessory Voltage:.....**208/230-1-60** V-Ph-Hz

## Acoustic Summary For FCU/CU-6

Project: ~Untitled68  
Prepared By:

08/19/2014

### Outdoor Unit Parameters:

Unit Model:.....**24ABB**  
Unit Size:.....**4 Tons High Efficiency**  
Variations:.....**Dense Grille**

Octave Band Center Frequency, Hz	63	125	250	500	1k	2k	4k	8k	dBA
Sound Power,dB	0.0	58.5	67.5	73.5	75.0	70.5	67.5	64.5	
A-Weighted Sound Power, dBA									80.0

### Indoor Unit Parameters:

Unit Model:.....**FX4D**  
Unit Size:.....**48,000 Btuh**  
Cabinet Insulation:.....**Single-piece cabinet with 1-in. super thick insulation**

Octave Band Center Frequency, Hz	63	125	250	500	1k	2k	4k	8k	dBA
Sound Power,dB	69.0	65.0	61.0	58.0	56.0	54.0	50.0	0.0	
A-Weighted Sound Power, dBA									0.0

24ABB3

# DIMENSIONS - ENGLISH

UNIT	SERIES	ELECTRICAL CHARACTERISTICS			A	B	C	D	E	F	G	K	L	M	N	P	OPERATING WEIGHT (lbs)	SHIPPING WEIGHT (lbs)	SHIPPING DIMENSIONS (L x W x H)	
24ABB318	2	X	0	0	23 1/8"	25 5/16"	3 3/4"	3/4"	4 7/16"	18 1/16"	7 13/16"	2 13/16"	1 1/2"	16 1/2"	15"	12"	107	130	24 1/4" x 27 3/8" x 33 1/2"	
24ABB324	1	X	0	0	23 1/8"	25 5/16"	3 3/4"	3/4"	4 7/16"	18 1/16"	7 13/16"	2 13/16"	1 1/2"	16 1/2"	15"	12"	110	134	24 1/4" x 27 3/8" x 33 1/2"	
24ABB330	1	X	0	0	23 1/8"	28 11/16"	3 3/4"	3/4"	4 7/16"	18 1/16"	7 13/16"	2 13/16"	1 1/2"	16 1/2"	15"	14"	111	136	24 1/4" x 27 3/8" x 33 1/2"	
24ABB336	1, 2	X	X	X	25 3/4"	32 5/16"	3 7/8"	7/8"	4 7/16"	21 1/4"	9 1/8"	2 15/16"	5/8"	14 1/4"	16"	16"	141	170	26 7/8" x 30 1/16" x 35 15/16"	
24ABB342	0, 1	X	0	X	31 3/16"	32 5/16"	3 7/8"	7/8"	6 9/16"	24 11/16"	9 1/8"	2 15/16"	5/8"	15 3/4"	16 1/4"	13 3/4"	190	218	32 3/8" x 35 1/2" x 35 15/16"	
24ABB348	1, 2	X	X	X	31 3/16"	35 3/4"	3 7/8"	7/8"	6 9/16"	24 11/16"	9 1/8"	2 15/16"	5/8"	16 3/8"	15 3/8"	15 1/4"	186	224	32 3/8" x 35 1/2" x 39 3/8"	
24ABB360	2	X	0	0	31 3/16"	25 1/2"	3 7/8"	7/8"	6 9/16"	24 11/16"	9 1/8"	2 15/16"	5/8"	14 1/8"	11 3/8"	11 3/8"	190	226	32 3/8" x 35 1/2" x 32 9/16"	
24ABB360	2	0	X	X	31 3/16"	28 15/16"	3 7/8"	7/8"	6 9/16"	24 11/16"	9 1/8"	2 15/16"	5/8"	16"	15 1/2"	12 3/4"	198	230	32 3/8" x 35 1/2" x 32 9/16"	

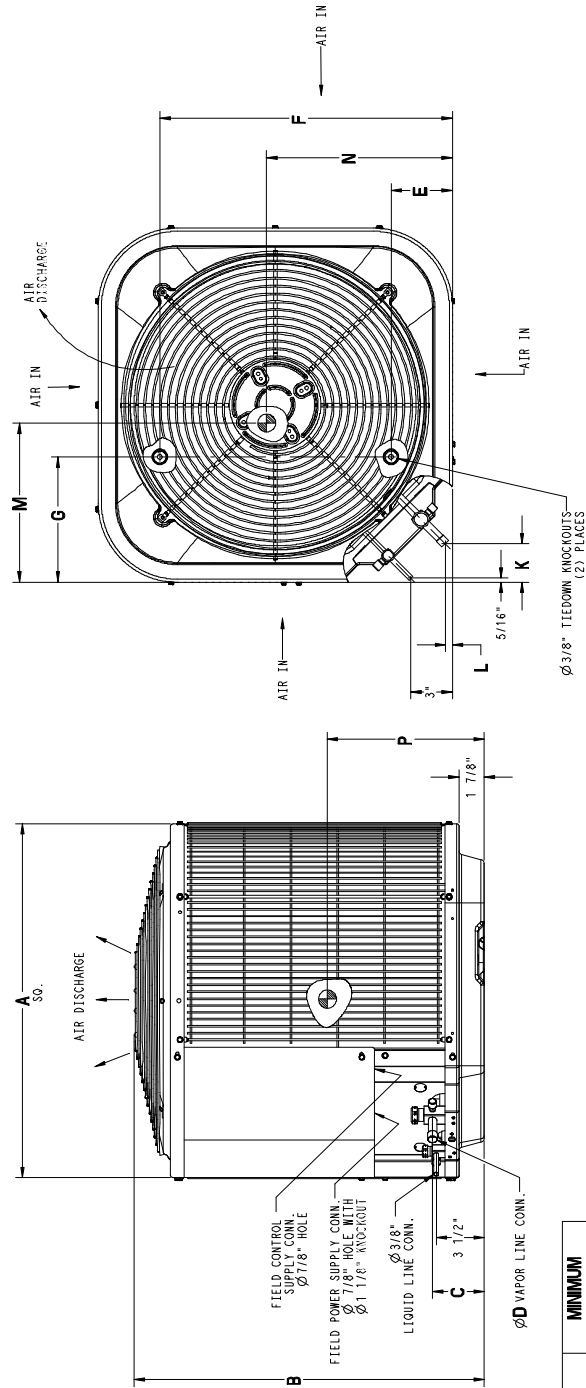
X = YES  
0 = NO

208-230-1-60

576

208/230-3-60

460-3-60



UNIT SIZE	MINIMUM MOUNTING PAD DIMENSIONS
18, 24, 30	23 1/2" X 23 1/2"
36	26" X 26"
48, 60	31 1/2" X 31 1/2"
-	35" X 35"

SLOPE COIL

HORIZ. LEFT  
(AS SHIPPED)

A-COIL



5

# Certified Drawing for FCU/CU-6

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Prepared By:

08/19/2014

## DIMENSIONS

UNIT	A	B	C	D	E	F	G	H	J	COIL CONFIGURATION SLOPE "A"	SHIPPING WT (LBS) NON TIN-COATED	SHIPPING WT (LBS) TIN-COATED
FX4DNF019	49 5/8"	17 5/8"	15 3/4"	15 5/8"	15 3/8"	23 1/8"	23 5/8"	—	17"	X	122	122
FX4DNF025	49 5/8"	17 5/8"	15 3/4"	15 5/8"	15 3/8"	23 1/8"	23 5/8"	—	17"	X	122	122
FX4DNF031	53 7/16"	21 1/8"	19 1/4"	19 1/8"	19 3/16"	26 15/16"	27 1/2"	—	19"	X	146	146
FX4DNF037	49 5/8"	21 1/8"	19 1/4"	19 1/8"	15 11/16"	23 7/16"	23 1/8"	—	—	X	157	157
FX4DNF043	49 5/8"	21 1/8"	19 1/4"	19 1/8"	15 11/16"	23 7/16"	23 1/8"	—	—	X	157	157
FX4DNF049	53 7/16"	24 11/16"	22 3/4"	22 11/16"	19 1/2"	27 1/4"	26 15/16"	—	—	X	185	185
FX4DNF061	59 3/16"	24 11/16"	22 3/4"	22 11/16"	25 1/4"	32 15/16"	32 5/8"	—	—	X	201	201

NOTE:

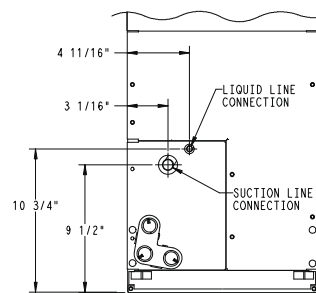
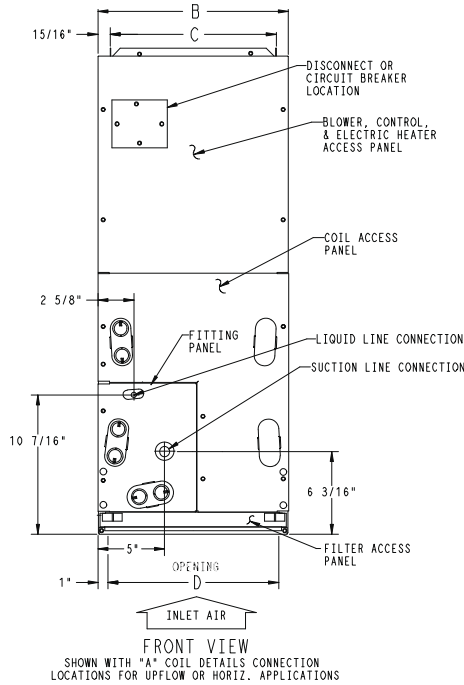
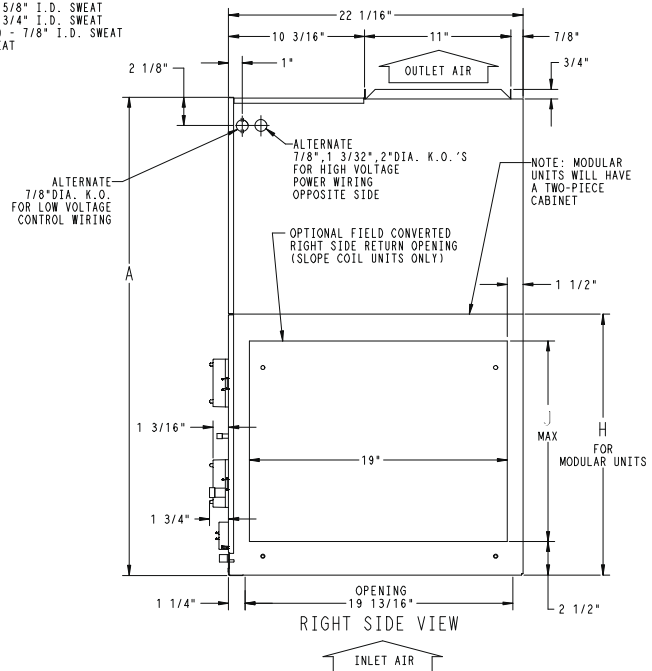
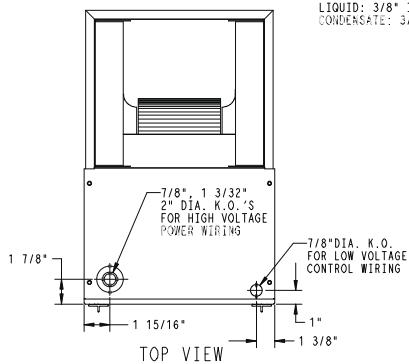
- SERIES DESIGNATION IS THE 14TH POSITION OF UNIT PRODUCT NUMBER
- ALL DIMENSIONS ARE IN "INCHES" UNLESS NOTED.

NOTE: ALLOW 21" FROM FRONT FOR SERVICE

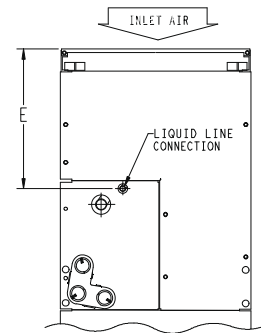
### UNIT CONNECTION SIZES

SUCTION: 018 & 024 - 5/8" I.D. SWEAT  
030 & 036 - 3/4" I.D. SWEAT  
042 THRU 060 - 7/8" I.D. SWEAT  
LIQUID: 3/8" I.D. SWEAT  
CONDENSATE: 3/4" FPT

FX4D



SLOPE COIL DETAILS  
CONNECTION LOCATIONS SHOWN  
FOR UPFLOW OR HORIZ.  
LEFT APPLICATIONS



ACCESS PANEL CONFIG. FOR  
SLOPE COILS  
DOWNFLOW OR HORIZ.  
RIGHT APPLICATIONS  
AND  
"A" COILS  
DOWNFLOW APPLICATIONS

Fig 1 - FXD - English

A10032

## GUIDE SPECIFICATIONS GENERAL 24ABB

### System Description

Outdoor-mounted, air-cooled, split-system air conditioner unit suitable for ground or rooftop installation. Unit consists of a hermetic compressor, an air-cooled coil, propeller-type condenser fan, and a control box. Unit will discharge supply air upward as shown on contract drawings. Unit will be used in a refrigeration circuit to match up to a packaged fan coil or coil unit.

### Quality Assurance

- Unit will be rated in accordance with the latest edition of ARI Standard 210.
- Unit will be certified for capacity and efficiency, and listed in the latest ARI directory.
- Unit construction will comply with latest edition of ANSI/ ASHRAE and with NEC.
- Unit will be constructed in accordance with UL standards and will carry the UL label of approval. Unit will have c-UL approval.
- Unit cabinet will be capable of withstanding Federal Test Method Standard No. 141 (Method 6061) 500-hr salt spray test.
- Air-cooled condenser coils will be leak tested at 150 psig and pressure tested at 450 psig.
- Unit constructed in ISO9001 approved facility.

### Delivery, Storage, and Handling

- Unit will be shipped as single package only and is stored and handled per unit manufacturer's recommendations.

### Warranty (for inclusion by specifying engineer)

- U.S. and Canada only.

## PRODUCTS

### AIR-COOLED, SPLIT-SYSTEM AIR CONDITIONER 24ABB 1-1/2 TO 5 NOMINAL TONS

### Equipment

- Factory assembled, single piece, air-cooled air conditioner unit. Contained within the unit enclosure is all factory wiring, piping, controls, compressor, refrigerant charge Puron® (R-410A), and special features required prior to field start-up.

### Unit Cabinet

- Unit cabinet will be constructed of galvanized steel, bonderized, and coated with a powder coat paint.

### Fans

- Condenser fan will be direct-drive propeller type, discharging air upward.
- Condenser fan motors will be totally enclosed, 1-phase type with class B insulation and permanently lubricated bearings. Shafts will be corrosion resistant.
- Fan blades will be statically and dynamically balanced.
- Condenser fan openings will be equipped with coated steel wire safety guards.

### Compressor

- Compressor will be hermetically sealed.
- Compressor will be mounted on rubber vibration isolators.

### Condenser Coil

- Condenser coil will be air cooled.
- Coil will be constructed of aluminum fins mechanically bonded to copper tubes which are then cleaned, dehydrated, and sealed.

### Refrigeration Components

- Refrigeration circuit components will include liquid-line shutoff valve with sweat connections, vapor-line shutoff valve with sweat connections, system charge of Puron® (R-410A) refrigerant, and compressor oil.
- Unit will be equipped with filter drier for Puron refrigerant.

### Operating Characteristics

- The capacity of the unit will meet or exceed \_\_\_\_\_ Btuh at a suction temperature of \_\_\_\_\_ °F. The power consumption at full load will not exceed \_\_\_\_\_ kW.
- Combination of the unit and the evaporator or fan coil unit will have a total net cooling capacity of \_\_\_\_\_ Btuh or greater at conditions of \_\_\_\_\_ CFM entering air temperature at the evaporator at \_\_\_\_\_ °F wet bulb and \_\_\_\_\_ °F dry bulb, and air entering the unit at \_\_\_\_\_ °F.
- The system will have a SEER of \_\_\_\_\_ Btuh/watt or greater at DOE conditions.

### Electrical Requirements

- Nominal unit electrical characteristics will be \_\_\_\_\_ v, single phase, 60 hz. The unit will be capable of satisfactory operation within voltage limits of \_\_\_\_\_ v to \_\_\_\_\_ v.
- Unit electrical power will be single point connection.
- Control circuit will be 24v.

### Special Features

- Refer to section of this literature identifying accessories and descriptions for specific features and available enhancements.

## Guide Specifications – Fan Coils – Fixed Speed

**Guide Specifications** for \_\_\_\_\_.  
(See the most recent edition of publication \_\_\_\_\_ for data for the specific model to be specified).

**Furnish and Install** \_\_\_\_\_ direct expansion fan coil(s) equipped with cooling control kit and \_\_\_\_\_(with) \_\_\_\_\_(without) electric heater in the location and manner shown on the plan. Unit shall operate properly in \_\_\_\_\_(vertical upflow) \_\_\_\_\_(horizontal right) \_\_\_\_\_(horizontal left) \_\_\_\_\_(vertical downflow) position and is to be installed with ductwork. Total cooling capacity shall be \_\_\_\_\_ Btuh or greater, and sensible heat capacity shall be \_\_\_\_\_ Btuh or greater, at conditions of \_\_\_\_\_ cfm, \_\_\_\_\_ degree F wb \_\_\_\_\_ degree F db air entering unit, and a coil refrigerant temperature of \_\_\_\_\_ degree F.

**Efficiency** shall be \_\_\_\_\_ when matched with outdoor unit \_\_\_\_\_ (per ARI ratings certification).

**Unit enclosure** shall be insulated with a 1 inch foil faced, high density, R4.2 insulation, and be constructed of prepainted galvanized steel. Large front service access panels shall provide easy access to all components. Unit shall be \_\_\_\_\_ (factory), \_\_\_\_\_ (field) equipped with reusable type filters. Filter shall be \_\_\_\_\_ inches (X) \_\_\_\_\_ inches.

**Fan** shall be forward curved with double inlet, mounted on motor shaft, dynamically and statically balanced. The fan shall deliver \_\_\_\_\_ cfm with \_\_\_\_\_ in. wg external static pressure operating at \_\_\_\_\_ hp. Fan-motor assembly shall be removable for service. Blower motor shall be induction type, of \_\_\_\_\_ hp.

**Cooling coil** shall have a face area of not less than \_\_\_\_\_ sq. ft. and be constructed with brazed copper tubing with aluminum lanced fins. Coil shall have TXV ( thermal expansion valve); refrigerant line fittings which permit braze connections. Condensate pans shall be equipped with primary and auxiliary drain connections with brass inserts, sloping, with minimal standing water retention. Refrigerant to be used will be \_\_\_\_\_(R-22) \_\_\_\_\_(R-410a).

**Blower controls** include control board with time delay relay, a 5 amp replaceable automotive-type circuit protection fuse, and motor speed tap selection terminal (SPT).

**Electric heater** \_\_\_\_\_ shall be \_\_\_\_\_(factory) \_\_\_\_\_(field) installed wired for \_\_\_\_\_(single) \_\_\_\_\_(multiple) supply circuit and \_\_\_\_\_(single) \_\_\_\_\_(3-phase) operation on fixed speed fan coil units. Standard heater control wiring shall be single stage with optional multiple staging capability. All heaters shall be equipped with thermal overload device, current overload for heater above 10 kw.

**Cooling control system** includes 40-VA control circuit (24 v) transformer, with replaceable 5 amp blade-type auto fuse. Low voltage connections shall be point-to-point “wire” connections.

**Maximum dimensions:** length \_\_\_\_\_ inches; width \_\_\_\_\_ inches; height \_\_\_\_\_ inches.

**Electrical requirements:** \_\_\_\_\_ volts, \_\_\_\_\_(single phase) \_\_\_\_\_(three phase) , frequency \_\_\_\_\_(60) \_\_\_\_\_(50) hertz.



## Unit Report For AHU CU 7 8

Project: ~Untitled65  
Prepared By:

05/30/2014



### Outdoor Unit Parameters

Unit Model:.....**24ABB**  
Unit Size:.....**1.5 Tons**  
Voltage:.....**208/230-1-60** V-Ph-Hz

### Indoor Unit Parameters

Unit Model:.....**FX4D**  
Unit Size:.....**18,000 Btuh**  
Cabinet Insulation:**Single-piece cabinet with 1-in. super thick insulation**  
Voltage:.....**208/230-1-60** V-Ph-Hz  
Heating Size:.....**No Heat**

### Outdoor Unit Dimensions and Weight

Unit Length:.....**25** in  
Unit Width:.....**36** in  
Unit Height:.....**34** in  
Unit Shipping Weight:.....**130** lb

### Indoor Unit Dimensions and Weight

Unit Length:.....**22.06** in  
Unit Width:.....**18** in  
Unit Height:.....**50** in  
Unit Shipping Weight:.....**122** lb

### Warranty Information

#### OTHER RESIDENTIAL APPLICATIONS (Apartments, Rental Properties, etc.)

The warranty period is five (5) years on parts. The warranty is to the original owner only and is not transferable.

#### OTHER APPLICATIONS

The warranty period is five (5) years on the compressor, and one (1) year on all other parts. The warranty is to the original owner only and is not transferable.

### Ordering Information

Part Number	Description	Quantity
<b>Outdoor Unit</b>		
24ABB318A003	24ABB Comfort Series Air Conditioner with Puron Refrigerant 1.5 Tons Cooling	2
	13 SEER @ ARI Conditions	2
	Dense Grille	2
<b>Accessories</b>		
KAACH1401AAA	Crankcase Heater	2
KAALP0401PUR	Low Pressure Switch	2
KSALA0301410	Low-Ambient Pressure Switch	2
KAAWS0101AAA	Winter Start Control	2
<b>Indoor Unit</b>		
FX4DNF019L00	FX4D Comfort Series Fan Coil with Puron 18000 BTU Cooling	2
	Single-piece cabinet with 1-in. super thick insulation	2
	Aluminum	2
<b>Accessories</b>		
KFCEH0801N08	8 kW, Electric Heater, Non-fused, 1 phase, with relays	2

## Performance Summary For AHU CU 7 8

Project: ~Untitled65  
Prepared By:

05/30/2014

### System Performance

<b>System:</b> .....	<b>24ABB/FX4D</b>	Actual Airflow:.....	<b>600.0</b>	CFM
System Quantity:.....	<b>2</b>	Standard Airflow:.....	<b>600.0</b>	CFM
Altitude:.....	<b>0.0</b> ft	Total Net Clg Capacity:.....	<b>17.16</b>	MBH
Linear Pipe Length:.....	<b>0.0</b> ft	Net Sensible Clg Capacity:.....	<b>13.85</b>	MBH
SEER @ ARI Conditions:.....	<b>14.5</b>	Total System Power:.....	<b>1.50</b>	kW
EER @ ARI Conditions:.....	<b>12.0</b>			

### System Parameters

#### Outdoor Unit Parameters

Unit Model:.....**24ABB318A003**  
Unit Size (Nominal):.....**1.5 Tons**  
Voltage:.....**208/230-1-60** V-Ph-Hz  
Clg Ent Air DB Ambient:.....**95.0** °F

#### Indoor Unit Parameters

Unit Model:.....**FX4DNF019L00**  
Unit Size (Nominal):.....**18,000 Btuh**  
Voltage:.....**208/230-1-60** V-Ph-Hz  
Ent Air DB:.....**77.30** °F  
Ent Air WB:.....**64.00** °F  
Ent Enthalpy:.....**29.14** BTU/lb  
Lvg Air DB:.....**55.92** °F  
Lvg Air WB:.....**54.40** °F  
Lvg Enthalpy:.....**22.79** BTU/lb  
Heating Size (Nominal):.....**No Heat**  
Indoor Unit External Static:.....**0.50** in wg

### Electrical Data

#### Outdoor Electrical Data

Unit Voltage:.....**208/230-1-60** V-Ph-Hz  
Fan Motor FLA:.....**0.50** Amps  
MCA:.....**11.8** Amps  
Max Fuse:.....**20** Amps  
Operating Range Min:.....**197** V  
Operating Range Max:.....**253** V  
Compressor RLA:.....**9.0** Amps  
Compressor LRA:.....**48.0** Amps

#### Indoor Electrical Data:

(For units with no factory installed electric heaters)  
Unit Voltage:.....**208/230-1-60** V-Ph-Hz  
Unit FLA:.....**2.8** Amps  
Unit MCA:.....**3.5** Amps  
Unit MOCP:.....**15.0** Amps  
Unit Min Wire Size:.....**14.0**  
Motor HP:.....**1/3** HP  
**Notice: Indoor Elect. data is for 208/230-1-60 voltage**

#### Accessory Electric Heater Data

(Single point power for unit WITH electric heaters)  
EH Part Number:.....**KFCEH0801N08**  
Electric Heater kW:.....**8.0** kW

#### For 2 wire operation (single circuit):

Heater Amps:.....**28.9/32.0** Amps  
Heater + Motor MCA:.....**44.7/48.5** Amps  
Heater + Motor MOCP:.....**45/50** Amps  
Accessory Voltage:.....**208/230-1-60** V-Ph-Hz

## Acoustic Summary For AHU CU 7 8

Project: ~Untitled65  
Prepared By:

05/30/2014

### Outdoor Unit Parameters:

Unit Model:.....**24ABB**  
Unit Size:.....**1.5 Tons**  
Variations:.....**Dense Grille**

Octave Band Center Frequency, Hz	63	125	250	500	1k	2k	4k	8k	dBA
Sound Power,dB	0.0	53.5	59.5	63.5	67.0	63.5	59.0	52.5	
A-Weighted Sound Power, dBA									72.0

### Indoor Unit Parameters:

Unit Model:.....**FX4D**  
Unit Size:.....**18,000 Btuh**  
Cabinet Insulation:.....**Single-piece cabinet with 1-in. super thick insulation**

Octave Band Center Frequency, Hz	63	125	250	500	1k	2k	4k	8k	dBA
Sound Power,dB	64.7	60.7	56.7	53.7	51.7	49.7	45.7	0.0	
A-Weighted Sound Power, dBA									0.0

24ABB3

# DIMENSIONS - ENGLISH

UNIT	SERIES	ELECTRICAL CHARACTERISTICS		A	B	C	D	E	F	G	K	L	M	N	P	OPERATING WEIGHT (lbs)	SHIPPING WEIGHT (lbs)	SHIPPING DIMENSIONS (L x W x H)	
24ABB318	2	X	0	0	23 1/8"	25 5/16"	3 3/4"	3/4"	4 7/16"	18 1/16"	7 13/16"	1/2"	16 1/2"	15"	12"	107	130	24 1/4" X 27 3/8" X 33 1/2"	
24ABB324	1	X	0	0	23 1/8"	25 5/16"	3 3/4"	3/4"	4 7/16"	18 1/16"	7 13/16"	1/2"	16 1/2"	15"	12"	110	134	24 1/4" X 27 3/8" X 33 1/2"	
24ABB330	1	X	0	0	23 1/8"	28 11/16"	3 3/4"	3/4"	4 7/16"	18 1/16"	7 13/16"	1/2"	16 1/2"	15"	14"	111	136	24 1/4" X 27 3/8" X 33 1/2"	
24ABB336	1, 2	X	X	X	25 3/4"	32 5/16"	3 7/8"	7/8"	4 7/16"	21 1/4"	9 1/8"	5/8"	14 1/4"	10 1/2"	16"	141	170	26 7/8" X 30 1/16" X 35 15/16"	
24ABB342	0, 1	X	0	X	31 3/16"	32 5/16"	3 7/8"	7/8"	6 9/16"	24 11/16"	9 1/8"	5/8"	15 3/4"	16 1/4"	13 3/4"	190	218	32 3/8" X 35 1/2" X 35 15/16"	
24ABB348	1, 2	X	X	X	31 3/16"	35 3/4"	3 7/8"	7/8"	6 9/16"	24 11/16"	9 1/8"	5/8"	16 3/8"	15 3/8"	15 1/4"	186	224	32 3/8" X 35 1/2" X 38 3/8"	
24ABB360	2	X	0	0	31 3/16"	25 1/2"	3 7/8"	7/8"	6 9/16"	24 11/16"	9 1/8"	5/8"	14 1/8"	15 3/8"	11 3/8"	190	226	32 3/8" X 35 1/2" X 32 9/16"	
24ABB360	2	0	X	X	31 3/16"	28 15/16"	3 7/8"	7/8"	6 9/16"	24 11/16"	9 1/8"	5/8"	16"	15 1/2"	12 3/4"	198	230	32 3/8" X 35 1/2" X 32 9/16"	

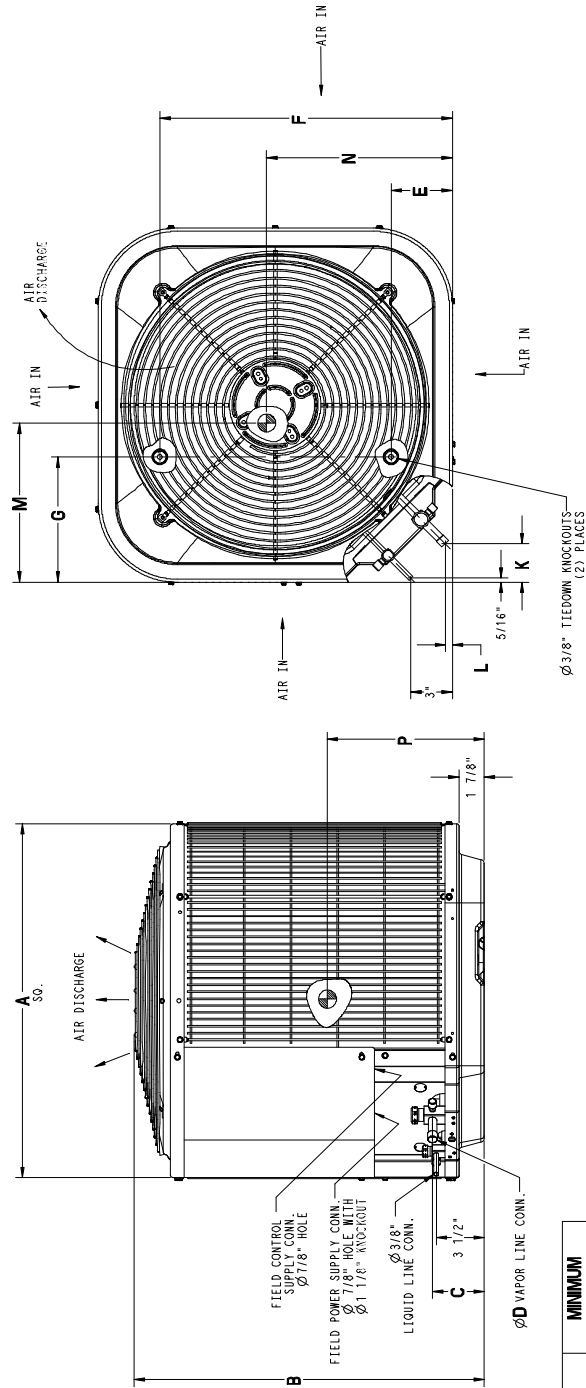
X = YES  
0 = NO

208-230-1-60

576

208/230-3-60

460-3-60



UNIT SIZE	MINIMUM MOUNTING PAD DIMENSIONS
18, 24, 30	23 1/2" X 23 1/2"
36	26" X 26"
48, 60	31 1/2" X 31 1/2"
-	35" X 35"

# Certified Drawing for AHU CU 7 8

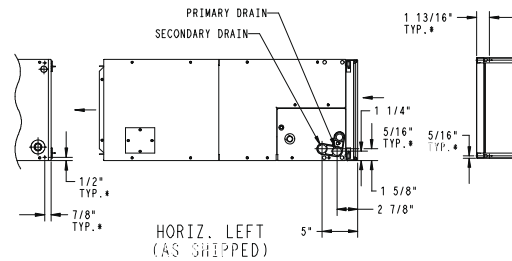
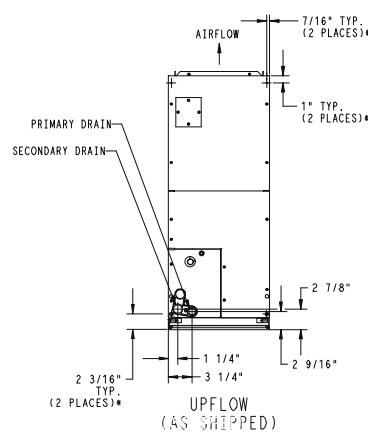
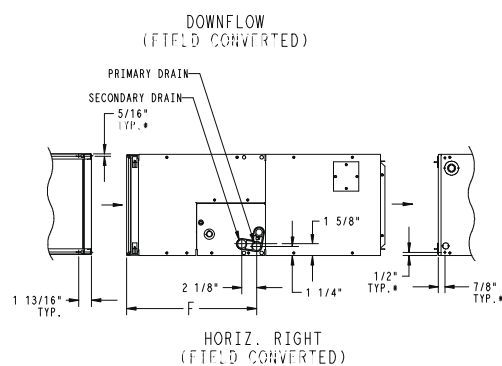
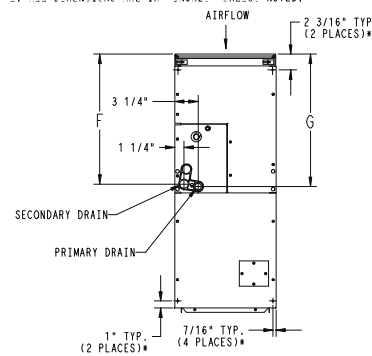
Project: ~Untitled65  
Prepared By:

05/30/2014

## DIMENSIONS (cont.)

### SLOPE COIL

- NOTES:  
1. CONDENSATE PAN DRAIN CAPS NOT SHOWN FOR CLARITY.  
2. ALL DIMENSIONS ARE IN "INCHES" UNLESS NOTED.



- \* HORIZONTAL MOUNT LOCATIONS - DIMPLES PROVIDED IN TOP PANEL, AND BACK OF CABINET. IN CABINET BOTTOM, HOLES PROVIDED .136" DIA. HORIZONTAL HANGING HARDWARE TO BE FIELD SUPPLIED.

### A-COIL

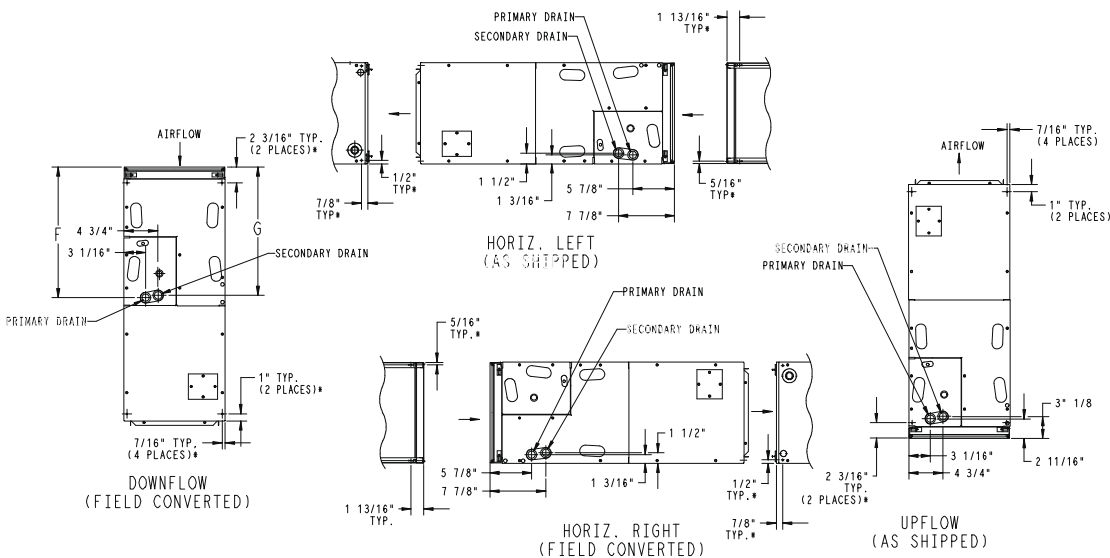


Fig 2 - FX4D - English

A10033

## DIMENSIONS

UNIT	A	B	C	D	E	F	G	H	J	COIL CONFIGURATION SLOPE "A"	SHIPPING WT (LBS) NON TIN-COATED	SHIPPING WT (LBS) TIN-COATED
FX4DNF019	49 5/8"	17 5/8"	15 3/4"	15 5/8"	15 3/8"	23 1/8"	23 5/8"	—	17"	X	122	122
FX4DNF025	49 5/8"	17 5/8"	15 3/4"	15 5/8"	15 3/8"	23 1/8"	23 5/8"	—	17"	X	122	122
FX4DNF031	53 7/16"	21 1/8"	19 1/4"	19 1/8"	19 3/16"	26 15/16"	27 1/2"	—	19"	X	146	146
FX4DNF037	49 5/8"	21 1/8"	19 1/4"	19 1/8"	15 11/16"	23 7/16"	23 1/8"	—	—	X	157	157
FX4DNF043	49 5/8"	21 1/8"	19 1/4"	19 1/8"	15 11/16"	23 7/16"	23 1/8"	—	—	X	157	157
FX4DNF049	53 7/16"	24 11/16"	22 3/4"	22 11/16"	19 1/2"	27 1/4"	26 15/16"	—	—	X	185	185
FX4DNF061	59 3/16"	24 11/16"	22 3/4"	22 11/16"	25 1/4"	32 15/16"	32 5/8"	—	—	X	201	201

### NOTE:

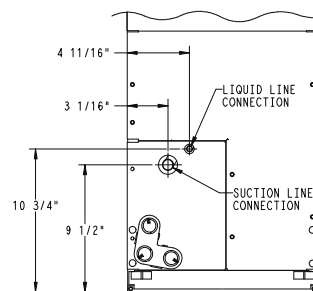
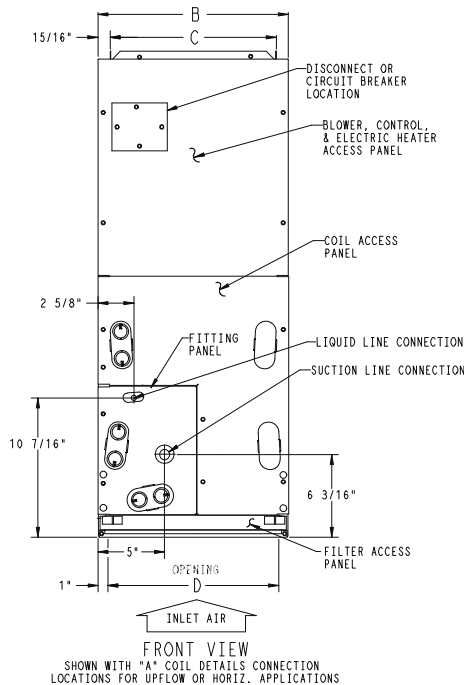
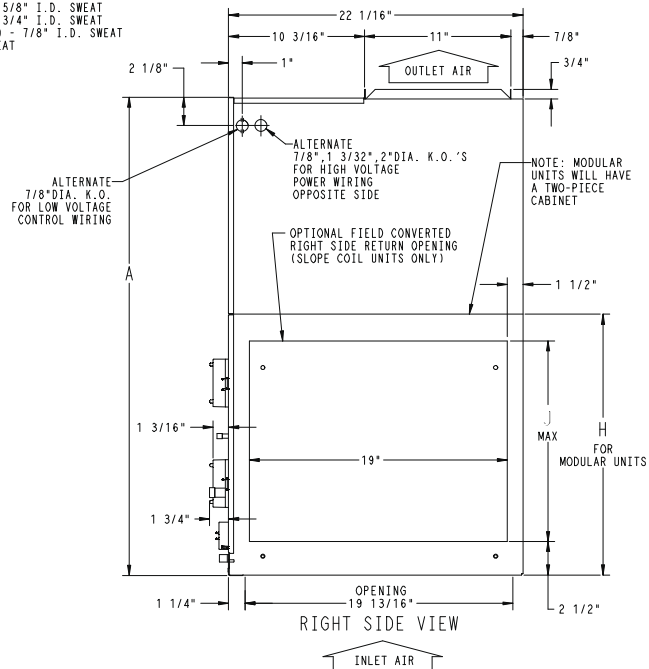
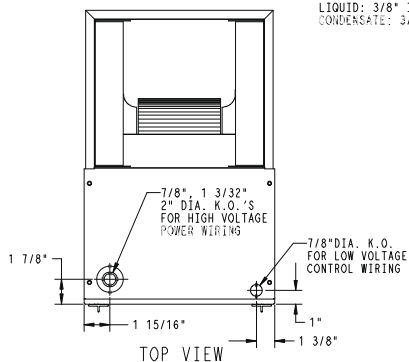
- SERIES DESIGNATION IS THE 14TH POSITION OF UNIT PRODUCT NUMBER
- ALL DIMENSIONS ARE IN "INCHES" UNLESS NOTED.

NOTE: ALLOW 21" FROM FRONT FOR SERVICE

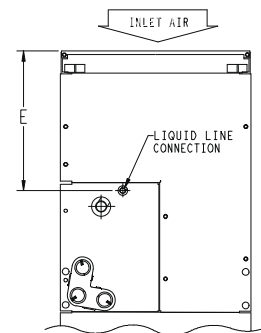
### UNIT CONNECTION SIZES

SUCTION: 018 & 024 - 5/8" I.D. SWEAT  
030 & 036 - 3/4" I.D. SWEAT  
042 THRU 060 - 7/8" I.D. SWEAT  
LIQUID: 3/8" I.D. SWEAT  
CONDENSATE: 3/4" FPT

FX4D



SLOPE COIL DETAILS  
CONNECTION LOCATIONS SHOWN  
FOR UPFLOW OR HORIZ.  
LEFT APPLICATIONS



ACCESS PANEL CONFIG. FOR  
SLOPE COILS  
DOWNFLOW OR HORIZ.  
RIGHT APPLICATIONS  
AND  
"A" COILS  
DOWNFLOW APPLICATIONS

Fig 1 - FXD - English

A10032

## Unit Report For AHU CU-9

Project: ~Untitled68  
Prepared By:

08/19/2014



### Outdoor Unit Parameters

Unit Model:.....**24ABB**  
Unit Size:.....**3 Tons**  
Voltage:.....**208/230-1-60** V-Ph-Hz

### Indoor Unit Parameters

Unit Model:.....**FX4D**  
Unit Size:.....**36,000 Btuh**  
Cabinet Insulation:**Single-piece cabinet with 1-in. super thick insulation**  
Voltage:.....**208/230-1-60** V-Ph-Hz  
Heating Size:.....**No Heat**

### Outdoor Unit Dimensions and Weight

Unit Length:.....**27** in  
Unit Width:.....**40** in  
Unit Height:.....**36** in  
Unit Shipping Weight:.....**170** lb

### Indoor Unit Dimensions and Weight

Unit Length:.....**22.06** in  
Unit Width:.....**21** in  
Unit Height:.....**50** in  
Unit Shipping Weight:.....**157** lb

### Warranty Information

#### OTHER RESIDENTIAL APPLICATIONS (Apartments, Rental Properties, etc.)

The warranty period is five (5) years on parts. The warranty is to the original owner only and is not transferable.

#### OTHER APPLICATIONS

The warranty period is five (5) years on the compressor, and one (1) year on all other parts. The warranty is to the original owner only and is not transferable.

### Ordering Information

Part Number	Description	Quantity
<b>Outdoor Unit</b>		
24ABB336A003	24ABB Comfort Series Air Conditioner with Puron Refrigerant 3 Tons Cooling	1
	13 SEER @ ARI Conditions	1
	Dense Grille	1
<b>Accessories</b>		
KAACH1401AAA	Crankcase Heater	1
KSALA0301410	Low-Ambient Pressure Switch	1
KAALP0401PUR	Low Pressure Switch	1
KAAWS0101AAA	Winter Start Control	1
<b>Indoor Unit</b>		
FX4DNF037L00	FX4D Comfort Series Fan Coil with Puron 36000 BTU Cooling	1
	Single-piece cabinet with 1-in. super thick insulation	1
	Aluminum	1
<b>Accessories</b>		
KFCEH3001F15	15 kW, Electric Heater, Fused, Stageable, with relays	1

## Performance Summary For AHU CU-9

Project: ~Untitled68  
Prepared By:

08/19/2014

### System Performance

<b>System:</b> .....	<b>24ABB/FX4D</b>	Actual Airflow:.....	<b>1200.0</b>	CFM
System Quantity:.....	<b>1</b>	Standard Airflow:.....	<b>1200.0</b>	CFM
Altitude:.....	<b>0.0</b> ft	Total Net Clg Capacity:.....	<b>33.95</b>	MBH
Linear Pipe Length:.....	<b>0.0</b> ft	Net Sensible Clg Capacity:.....	<b>27.10</b>	MBH
SEER @ ARI Conditions:.....	<b>14.5</b>	Total System Power:.....	<b>2.85</b>	kW
EER @ ARI Conditions:.....	<b>12.0</b>			

### System Parameters

#### Outdoor Unit Parameters

Unit Model:.....**24ABB336A003**  
Unit Size (Nominal):.....**3 Tons**  
Voltage:.....**208/230-1-60** V-Ph-Hz  
Clg Ent Air DB Ambient:.....**95.0** °F

#### Indoor Unit Parameters

Unit Model:.....**FX4DNF037L00**  
Unit Size (Nominal):.....**36,000 Btuh**  
Voltage:.....**208/230-1-60** V-Ph-Hz  
Ent Air DB:.....**79.60** °F  
Ent Air WB:.....**66.00** °F  
Ent Enthalpy:.....**30.65** BTU/lb  
Lvg Air DB:.....**58.69** °F  
Lvg Air WB:.....**56.96** °F  
Lvg Enthalpy:.....**24.36** BTU/lb  
Heating Size (Nominal):.....**No Heat**  
Indoor Unit External Static:.....**0.50** in wg

### Electrical Data

#### Outdoor Electrical Data

Unit Voltage:.....**208/230-1-60** V-Ph-Hz  
Fan Motor FLA:.....**1.40** Amps  
MCA:.....**21.5** Amps  
Max Fuse:.....**30** Amps  
Operating Range Min:.....**197** V  
Operating Range Max:.....**253** V  
Compressor RLA:.....**15.3** Amps  
Compressor LRA:.....**77.0** Amps

#### Indoor Electrical Data:

(For units with no factory installed electric heaters)  
Unit Voltage:.....**208/230-1-60** V-Ph-Hz  
Unit FLA:.....**4.1** Amps  
Unit MCA:.....**5.1** Amps  
Unit MOCP:.....**15.0** Amps  
Unit Min Wire Size:.....**14.0**  
Motor HP:.....**1/2** HP  
**Notice: Indoor Elect. data is for 208/230-1-60 voltage**

#### Accessory Electric Heater Data

(Single point power for unit WITH electric heaters)  
EH Part Number:.....**KFCEH3001F15**  
Electric Heater kW:.....**15.0** kW

#### For 2 wire operation (single circuit):

Heater Amps:.....**54.2/59.9** Amps  
Heater + Motor MCA:.....**76.3/83.4** Amps  
Heater + Motor MOCP:.....**80/90** Amps

#### For 4 wire operation (dual circuit):

Heater Amps L1/L2:.....**36.2/40.0** Amps  
Heater + Motor MOCP L1/L2:.....**60/60** Amps  
Heater Amps L3/L4:.....**18.1/20.0** Amps  
Heater + Motor MOCP L3/L4:.....**25/25** Amps  
Accessory Voltage:.....**208/230-1-60** V-Ph-Hz



## Acoustic Summary For AHU CU-9

Project: ~Untitled68  
Prepared By:

08/19/2014

### Outdoor Unit Parameters:

Unit Model:.....**24ABB**  
Unit Size:.....**3 Tons**  
Variations:.....**Dense Grille**

Octave Band Center Frequency, Hz	63	125	250	500	1k	2k	4k	8k	dBA
Sound Power,dB	0.0	59.5	63.0	68.5	70.0	65.5	61.5	53.5	
A-Weighted Sound Power, dBA									75.0

### Indoor Unit Parameters:

Unit Model:.....**FX4D**  
Unit Size:.....**36,000 Btuh**  
Cabinet Insulation:.....**Single-piece cabinet with 1-in. super thick insulation**

Octave Band Center Frequency, Hz	63	125	250	500	1k	2k	4k	8k	dBA
Sound Power,dB	67.8	63.8	59.8	56.8	54.8	52.8	48.8	0.0	
A-Weighted Sound Power, dBA									0.0

24ABB3

# DIMENSIONS - ENGLISH

UNIT	SERIES	ELECTRICAL CHARACTERISTICS		A	B	C	D	E	F	G	K	L	M	N	P	OPERATING WEIGHT (lbs)	SHIPPING WEIGHT (lbs)	SHIPPING DIMENSIONS (L x W x H)	
24ABB318	2	X	0	0	23 1/8"	25 5/16"	3 3/4"	3/4"	4 7/16"	18 1/16"	7 13/16"	1/2"	16 1/2"	15"	12"	107	130	24 1/4" X 27 3/8" X 33 1/2"	
24ABB324	1	X	0	0	23 1/8"	25 5/16"	3 3/4"	3/4"	4 7/16"	18 1/16"	7 13/16"	1/2"	16 1/2"	15"	12"	110	134	24 1/4" X 27 3/8" X 33 1/2"	
24ABB330	1	X	0	0	23 1/8"	28 11/16"	3 3/4"	3/4"	4 7/16"	18 1/16"	7 13/16"	1/2"	16 1/2"	15"	14"	111	136	24 1/4" X 27 3/8" X 33 1/2"	
24ABB336	1, 2	X	X	X	25 3/4"	32 5/16"	3 7/8"	7/8"	4 7/16"	21 1/4"	9 1/8"	5/8"	14 1/4"	10 1/2"	16"	141	170	26 7/8" X 30 1/16" X 35 15/16"	
24ABB342	0, 1	X	0	X	31 3/16"	32 5/16"	3 7/8"	7/8"	6 9/16"	24 11/16"	9 1/8"	5/8"	15 3/4"	16 1/4"	13 3/4"	190	218	32 3/8" X 35 1/2" X 35 15/16"	
24ABB348	1, 2	X	X	X	31 3/16"	35 3/4"	3 7/8"	7/8"	6 9/16"	24 11/16"	9 1/8"	5/8"	16 3/8"	15 3/8"	15 1/4"	186	224	32 3/8" X 35 1/2" X 38 3/8"	
24ABB360	2	X	0	0	31 3/16"	25 1/2"	3 7/8"	7/8"	6 9/16"	24 11/16"	9 1/8"	5/8"	14 1/8"	15 3/8"	11 3/8"	190	226	32 3/8" X 35 1/2" X 32 9/16"	
24ABB360	2	0	X	X	31 3/16"	28 15/16"	3 7/8"	7/8"	6 9/16"	24 11/16"	9 1/8"	5/8"	16"	15 1/2"	12 3/4"	198	230	32 3/8" X 35 1/2" X 32 9/16"	

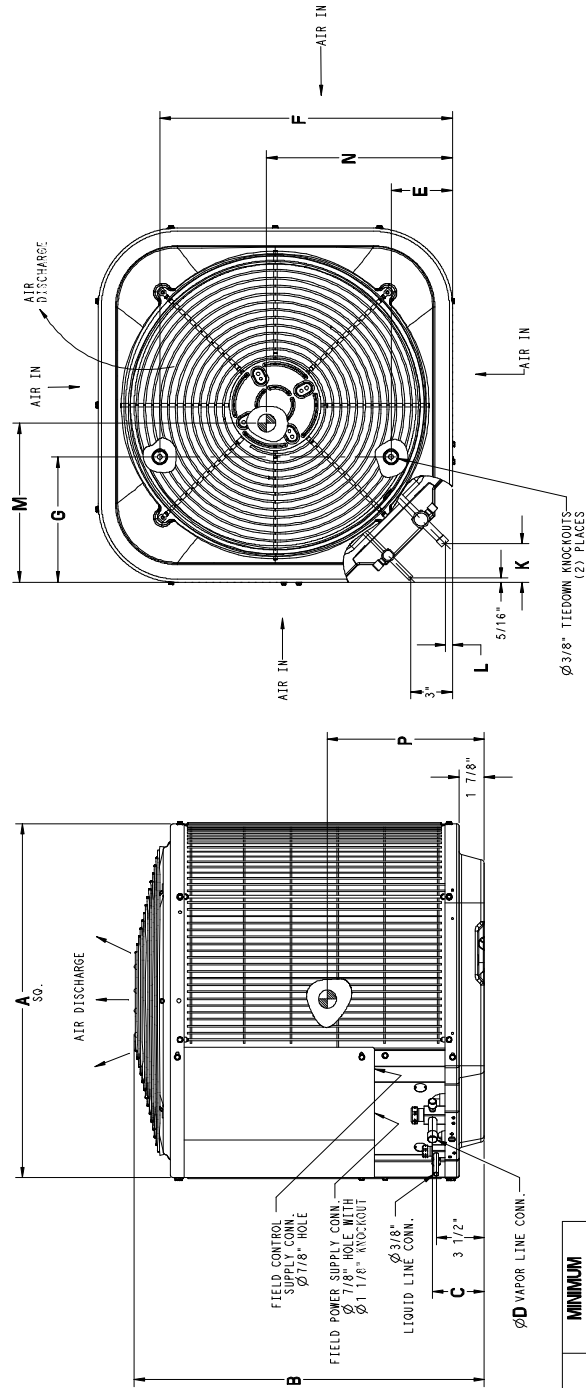
X = YES  
0 = NO

208-230-1-60

576

208/230-3-60

460-3-60



UNIT SIZE	MINIMUM MOUNTING PAD DIMENSIONS
18, 24, 30	23 1/2" X 23 1/2"
36	26" X 26"
48, 60	31 1/2" X 31 1/2"
-	35" X 35"

SLOPE COIL

HORIZ. LEFT  
(AS SHIPPED)

A-COIL



5

# Certified Drawing for AHU CU-9

Project: ~Untitled68  
Prepared By:

08/19/2014

## DIMENSIONS

UNIT	A	B	C	D	E	F	G	H	J	COIL CONFIGURATION SLOPE "A"	SHIPPING WT (LBS) NON TIN-COATED	SHIPPING WT (LBS) TIN-COATED
FX4DNF019	49 5/8"	17 5/8"	15 3/4"	15 5/8"	15 3/8"	23 1/8"	23 5/8"	—	17"	X —	122	122
FX4DNF025	49 5/8"	17 5/8"	15 3/4"	15 5/8"	15 3/8"	23 1/8"	23 5/8"	—	17"	X —	122	122
FX4DNF031	53 7/16"	21 1/8"	19 1/4"	19 1/8"	19 3/16"	26 15/16"	27 1/2"	—	19"	X —	146	146
FX4DNF037	49 5/8"	21 1/8"	19 1/4"	19 1/8"	15 11/16"	23 7/16"	23 1/8"	—	—	X	157	157
FX4DNF043	49 5/8"	21 1/8"	19 1/4"	19 1/8"	15 11/16"	23 7/16"	23 1/8"	—	—	X	157	157
FX4DNF049	53 7/16"	24 11/16"	22 3/4"	22 11/16"	19 1/2"	27 1/4"	26 15/16"	—	—	X	185	185
FX4DNF061	59 3/16"	24 11/16"	22 3/4"	22 11/16"	25 1/4"	32 15/16"	32 5/8"	—	—	X	201	201

NOTE:

- SERIES DESIGNATION IS THE 14TH POSITION OF UNIT PRODUCT NUMBER
- ALL DIMENSIONS ARE IN "INCHES" UNLESS NOTED.

NOTE: ALLOW 21" FROM FRONT FOR SERVICE

### UNIT CONNECTION SIZES

SUCTION: 018 & 024 - 5/8" I.D. SWEAT  
030 & 036 - 3/4" I.D. SWEAT  
042 THRU 060 - 7/8" I.D. SWEAT  
LIQUID: 3/8" I.D. SWEAT  
CONDENSATE: 3/4" FPT

FX4D

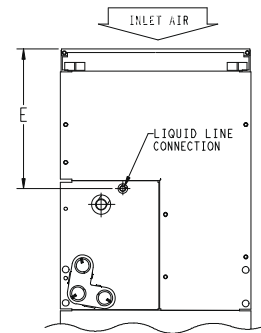
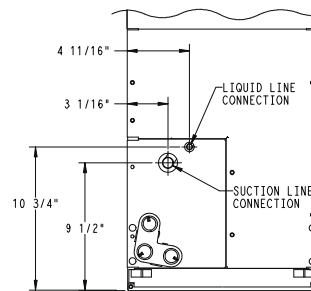
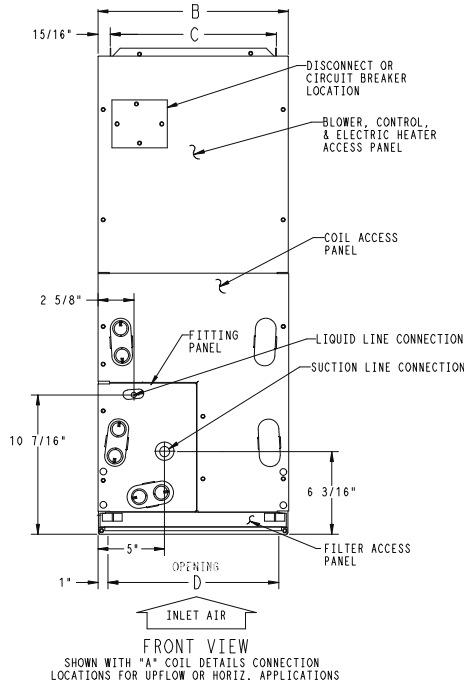
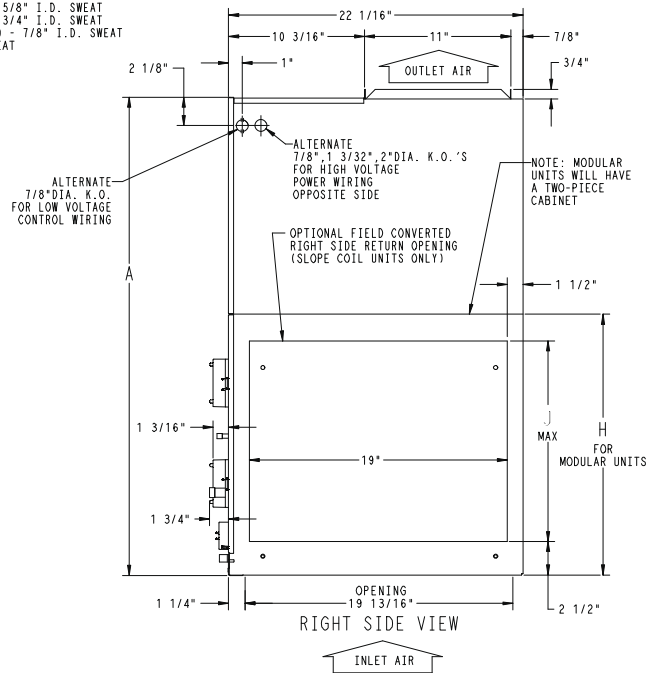
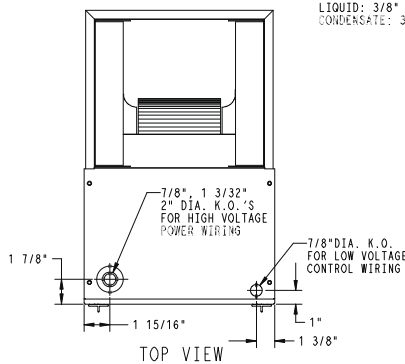


Fig 1 - FXD - English

A10032

## GUIDE SPECIFICATIONS GENERAL 24ABB

### System Description

Outdoor-mounted, air-cooled, split-system air conditioner unit suitable for ground or rooftop installation. Unit consists of a hermetic compressor, an air-cooled coil, propeller-type condenser fan, and a control box. Unit will discharge supply air upward as shown on contract drawings. Unit will be used in a refrigeration circuit to match up to a packaged fan coil or coil unit.

### Quality Assurance

- Unit will be rated in accordance with the latest edition of ARI Standard 210.
- Unit will be certified for capacity and efficiency, and listed in the latest ARI directory.
- Unit construction will comply with latest edition of ANSI/ ASHRAE and with NEC.
- Unit will be constructed in accordance with UL standards and will carry the UL label of approval. Unit will have c-UL approval.
- Unit cabinet will be capable of withstanding Federal Test Method Standard No. 141 (Method 6061) 500-hr salt spray test.
- Air-cooled condenser coils will be leak tested at 150 psig and pressure tested at 450 psig.
- Unit constructed in ISO9001 approved facility.

### Delivery, Storage, and Handling

- Unit will be shipped as single package only and is stored and handled per unit manufacturer's recommendations.

### Warranty (for inclusion by specifying engineer)

- U.S. and Canada only.

## PRODUCTS

### AIR-COOLED, SPLIT-SYSTEM AIR CONDITIONER 24ABB 1-1/2 TO 5 NOMINAL TONS

### Equipment

- Factory assembled, single piece, air-cooled air conditioner unit. Contained within the unit enclosure is all factory wiring, piping, controls, compressor, refrigerant charge Puron® (R-410A), and special features required prior to field start-up.

### Unit Cabinet

- Unit cabinet will be constructed of galvanized steel, bonderized, and coated with a powder coat paint.

### Fans

- Condenser fan will be direct-drive propeller type, discharging air upward.
- Condenser fan motors will be totally enclosed, 1-phase type with class B insulation and permanently lubricated bearings. Shafts will be corrosion resistant.
- Fan blades will be statically and dynamically balanced.
- Condenser fan openings will be equipped with coated steel wire safety guards.

### Compressor

- Compressor will be hermetically sealed.
- Compressor will be mounted on rubber vibration isolators.

### Condenser Coil

- Condenser coil will be air cooled.
- Coil will be constructed of aluminum fins mechanically bonded to copper tubes which are then cleaned, dehydrated, and sealed.

### Refrigeration Components

- Refrigeration circuit components will include liquid-line shutoff valve with sweat connections, vapor-line shutoff valve with sweat connections, system charge of Puron® (R-410A) refrigerant, and compressor oil.
- Unit will be equipped with filter drier for Puron refrigerant.

### Operating Characteristics

- The capacity of the unit will meet or exceed \_\_\_\_\_ Btuh at a suction temperature of \_\_\_\_\_ °F. The power consumption at full load will not exceed \_\_\_\_\_ kW.
- Combination of the unit and the evaporator or fan coil unit will have a total net cooling capacity of \_\_\_\_\_ Btuh or greater at conditions of \_\_\_\_\_ CFM entering air temperature at the evaporator at \_\_\_\_\_ °F wet bulb and \_\_\_\_\_ °F dry bulb, and air entering the unit at \_\_\_\_\_ °F.
- The system will have a SEER of \_\_\_\_\_ Btuh/watt or greater at DOE conditions.

### Electrical Requirements

- Nominal unit electrical characteristics will be \_\_\_\_\_ v, single phase, 60 hz. The unit will be capable of satisfactory operation within voltage limits of \_\_\_\_\_ v to \_\_\_\_\_ v.
- Unit electrical power will be single point connection.
- Control circuit will be 24v.

### Special Features

- Refer to section of this literature identifying accessories and descriptions for specific features and available enhancements.

## Guide Specifications – Fan Coils – Fixed Speed

**Guide Specifications** for \_\_\_\_\_.  
(See the most recent edition of publication \_\_\_\_\_ for data for the specific model to be specified).

**Furnish and Install** \_\_\_\_\_ direct expansion fan coil(s) equipped with cooling control kit and \_\_\_\_\_(with) \_\_\_\_\_(without) electric heater in the location and manner shown on the plan. Unit shall operate properly in \_\_\_\_\_(vertical upflow) \_\_\_\_\_(horizontal right) \_\_\_\_\_(horizontal left) \_\_\_\_\_(vertical downflow) position and is to be installed with ductwork. Total cooling capacity shall be \_\_\_\_\_ Btuh or greater, and sensible heat capacity shall be \_\_\_\_\_ Btuh or greater, at conditions of \_\_\_\_\_ cfm, \_\_\_\_\_ degree F wb \_\_\_\_\_ degree F db air entering unit, and a coil refrigerant temperature of \_\_\_\_\_ degree F.

**Efficiency** shall be \_\_\_\_\_ when matched with outdoor unit \_\_\_\_\_ (per ARI ratings certification).

**Unit enclosure** shall be insulated with a 1 inch foil faced, high density, R4.2 insulation, and be constructed of prepainted galvanized steel. Large front service access panels shall provide easy access to all components. Unit shall be \_\_\_\_\_ (factory), \_\_\_\_\_ (field) equipped with reusable type filters. Filter shall be \_\_\_\_\_ inches (X) \_\_\_\_\_ inches.

**Fan** shall be forward curved with double inlet, mounted on motor shaft, dynamically and statically balanced. The fan shall deliver \_\_\_\_\_ cfm with \_\_\_\_\_ in. wg external static pressure operating at \_\_\_\_\_ hp. Fan-motor assembly shall be removable for service. Blower motor shall be induction type, of \_\_\_\_\_ hp.

**Cooling coil** shall have a face area of not less than \_\_\_\_\_ sq. ft. and be constructed with brazed copper tubing with aluminum lanced fins. Coil shall have TXV ( thermal expansion valve); refrigerant line fittings which permit braze connections. Condensate pans shall be equipped with primary and auxiliary drain connections with brass inserts, sloping, with minimal standing water retention. Refrigerant to be used will be \_\_\_\_\_(R-22) \_\_\_\_\_(R-410a).

**Blower controls** include control board with time delay relay, a 5 amp replaceable automotive-type circuit protection fuse, and motor speed tap selection terminal (SPT).

**Electric heater** \_\_\_\_\_ shall be \_\_\_\_\_(factory) \_\_\_\_\_(field) installed wired for \_\_\_\_\_(single) \_\_\_\_\_(multiple) supply circuit and \_\_\_\_\_(single) \_\_\_\_\_(3-phase) operation on fixed speed fan coil units. Standard heater control wiring shall be single stage with optional multiple staging capability. All heaters shall be equipped with thermal overload device, current overload for heater above 10 kw.

**Cooling control system** includes 40-VA control circuit (24 v) transformer, with replaceable 5 amp blade-type auto fuse. Low voltage connections shall be point-to-point “wire” connections.

**Maximum dimensions:** length \_\_\_\_\_ inches; width \_\_\_\_\_ inches; height \_\_\_\_\_ inches.

**Electrical requirements:** \_\_\_\_\_ volts, \_\_\_\_\_(single phase) \_\_\_\_\_(three phase) , frequency \_\_\_\_\_(60) \_\_\_\_\_(50) hertz.

## Unit Report For AHU CU 10

Project: ~Untitled65  
Prepared By:

05/30/2014



### Outdoor Unit Parameters

Unit Model:.....**24ABB**  
Unit Size:.....**2 Tons**  
Voltage:.....**208/230-1-60** V-Ph-Hz

### Indoor Unit Parameters

Unit Model:.....**FX4D**  
Unit Size:.....**24,000 Btuh**  
Cabinet Insulation:**Single-piece cabinet with 1-in. super thick insulation**  
Voltage:.....**208/230-1-60** V-Ph-Hz  
Heating Size:.....**5 kW**

### Outdoor Unit Dimensions and Weight

Unit Length:.....**25** in  
Unit Width:.....**36** in  
Unit Height:.....**34** in  
Unit Shipping Weight:.....**134** lb

### Indoor Unit Dimensions and Weight

Unit Length:.....**22.06** in  
Unit Width:.....**18** in  
Unit Height:.....**50** in  
Unit Shipping Weight:.....**122** lb

### Warranty Information

#### OTHER RESIDENTIAL APPLICATIONS (Apartments, Rental Properties, etc.)

The warranty period is five (5) years on parts. The warranty is to the original owner only and is not transferable.

#### OTHER APPLICATIONS

The warranty period is five (5) years on the compressor, and one (1) year on all other parts. The warranty is to the original owner only and is not transferable.

### Ordering Information

Part Number	Description	Quantity
<b>Outdoor Unit</b>		
24ABB324A003	24ABB Comfort Series Air Conditioner with Puron Refrigerant 2 Tons Cooling	1
	13 SEER @ ARI Conditions	1
	Dense Grille	1
<b>Accessories</b>		
KAACH1401AAA	Crankcase Heater	1
KAALP0401PUR	Low Pressure Switch	1
KSALA0301410	Low-Ambient Pressure Switch	1
KAAWS0101AAA	Winter Start Control	1
<b>Indoor Unit</b>		
FX4DNF025T05	FX4D Comfort Series Fan Coil with Puron 24000 BTU Cooling	1
	Single-piece cabinet with 1-in. super thick insulation	1
	Armor Coating	1
<b>Accessories</b>		
KFCEH0801N08	8 kW, Electric Heater, Non-fused, 1 phase, with relays	2

## Performance Summary For AHU CU 10

Project: ~Untitled65  
Prepared By:

05/30/2014

### System Performance

<b>System:</b> .....	<b>24ABB/FX4D</b>	Actual Airflow:.....	<b>800.0</b>	CFM
System Quantity:.....	<b>1</b>	Standard Airflow:.....	<b>800.0</b>	CFM
Altitude:.....	<b>0.0</b> ft	Total Net Clg Capacity:.....	<b>22.92</b>	MBH
Linear Pipe Length:.....	<b>0.0</b> ft	Net Sensible Clg Capacity:.....	<b>17.38</b>	MBH
SEER @ ARI Conditions:.....	<b>14.5</b>	Total System Power:.....	<b>1.94</b>	kW
EER @ ARI Conditions:.....	<b>12.0</b>			

### System Parameters

#### Outdoor Unit Parameters

Unit Model:.....**24ABB324A003**  
Unit Size (Nominal):.....**2 Tons**  
Voltage:.....**208/230-1-60** V-Ph-Hz  
Clg Ent Air DB Ambient:.....**95.0** °F

#### Indoor Unit Parameters

Unit Model:.....**FX4DNF025T05**  
Unit Size (Nominal):.....**24,000 Btu/h**  
Voltage:.....**208/230-1-60** V-Ph-Hz  
Ent Air DB:.....**78.00** °F  
Ent Air WB:.....**65.20** °F  
Ent Enthalpy:.....**30.05** BTU/lb  
Lvg Air DB:.....**57.89** °F  
Lvg Air WB:.....**55.87** °F  
Lvg Enthalpy:.....**23.68** BTU/lb  
Heating Size (Nominal):.....**5 kW**  
Indoor Unit External Static:.....**0.50** in wg  
Clg Coil Note:\*\*\* **Check PD for min EH airflow.**

### Electrical Data

#### Outdoor Electrical Data

Unit Voltage:.....**208/230-1-60** V-Ph-Hz  
Fan Motor FLA:.....**0.77** Amps  
MCA:.....**17.6** Amps  
Max Fuse:.....**25** Amps  
Operating Range Min:.....**197** V  
Operating Range Max:.....**253** V  
Compressor RLA:.....**13.5** Amps  
Compressor LRA:.....**58.3** Amps

#### Indoor Electrical Data

(For units with factory installed electric heaters)  
Unit Voltage:.....**208/230-1-60** V-Ph-Hz  
Electric Heater kW:.....**5.0** kW  
Motor HP:.....**1/3** HP  
Motor FLA:.....**2.8** Amps  
**For 2 wire operation (single circuit):**  
Heater Amps L1/L2:.....**18.1/20.0** Amps  
Heater + Motor MCA L1/L2:.....**26.1/28.5** Amps  
Heater + Motor MOCP L1/L2:.....**30/30** Amps  
Note:.....**All units use single point connection.**  
**Notice: Indoor Elect. data is for 208/230-1-60 voltage**

#### Accessory Electric Heater Data

(Single point power for unit WITH electric heaters)  
EH Part Number:.....**KFCEH0801N08**  
Electric Heater kW:.....**8.0** kW  
**For 2 wire operation (single circuit):**  
Heater Amps:.....**28.9/32.0** Amps  
Heater + Motor MCA:.....**44.7/48.5** Amps  
Heater + Motor MOCP:.....**45/50** Amps  
Accessory Voltage:.....**208/230-1-60** V-Ph-Hz



## Acoustic Summary For AHU CU 10

Project: ~Untitled65  
Prepared By:

05/30/2014

### Outdoor Unit Parameters:

Unit Model:.....**24ABB**  
Unit Size:.....**2 Tons**  
Variations:.....**Dense Grille**

Octave Band Center Frequency, Hz	63	125	250	500	1k	2k	4k	8k	dBA
Sound Power,dB	0.0	55.0	61.5	67.0	71.5	69.0	61.0	55.0	
A-Weighted Sound Power, dBA									76.0

### Indoor Unit Parameters:

Unit Model:.....**FX4D**  
Unit Size:.....**24,000 Btuh**  
Cabinet Insulation:.....**Single-piece cabinet with 1-in. super thick insulation**

Octave Band Center Frequency, Hz	63	125	250	500	1k	2k	4k	8k	dBA
Sound Power,dB	66.0	62.0	58.0	55.0	53.0	51.0	47.0	0.0	
A-Weighted Sound Power, dBA									0.0

24ABB3

# DIMENSIONS - ENGLISH

UNIT	SERIES	ELECTRICAL CHARACTERISTICS		A	B	C	D	E	F	G	K	L	M	N	P	OPERATING WEIGHT (lbs)	SHIPPING WEIGHT (lbs)	SHIPPING DIMENSIONS (L x W x H)	
24ABB318	2	X	0	0	23 1/8"	25 5/16"	3 3/4"	3/4"	4 7/16"	18 1/16"	7 13/16"	1/2"	16 1/2"	15"	12"	107	130	24 1/4" X 27 3/8" X 33 1/2"	
24ABB324	1	X	0	0	23 1/8"	25 5/16"	3 3/4"	3/4"	4 7/16"	18 1/16"	7 13/16"	1/2"	16 1/2"	15"	12"	110	134	24 1/4" X 27 3/8" X 33 1/2"	
24ABB330	1	X	0	0	23 1/8"	28 11/16"	3 3/4"	3/4"	4 7/16"	18 1/16"	7 13/16"	1/2"	16 1/2"	15"	14"	111	136	24 1/4" X 27 3/8" X 33 1/2"	
24ABB336	1, 2	X	X	X	25 3/4"	32 5/16"	3 7/8"	7/8"	4 7/16"	21 1/4"	9 1/8"	5/8"	14 1/4"	10 1/2"	16"	141	170	26 7/8" X 30 1/16" X 35 15/16"	
24ABB342	0, 1	X	0	X	31 3/16"	32 5/16"	3 7/8"	7/8"	6 9/16"	24 11/16"	9 1/8"	5/8"	15 3/4"	16 1/4"	13 3/4"	190	218	32 3/8" X 35 1/2" X 35 15/16"	
24ABB348	1, 2	X	X	X	31 3/16"	35 3/4"	3 7/8"	7/8"	6 9/16"	24 11/16"	9 1/8"	5/8"	16 3/8"	15 3/8"	15 1/4"	186	224	32 3/8" X 35 1/2" X 38 3/8"	
24ABB360	2	X	0	0	31 3/16"	25 1/2"	3 7/8"	7/8"	6 9/16"	24 11/16"	9 1/8"	5/8"	14 1/8"	15 3/8"	11 3/8"	190	226	32 3/8" X 35 1/2" X 32 9/16"	
24ABB360	2	0	X	X	31 3/16"	28 15/16"	3 7/8"	7/8"	6 9/16"	24 11/16"	9 1/8"	5/8"	16"	15 1/2"	12 3/4"	198	230	32 3/8" X 35 1/2" X 32 9/16"	

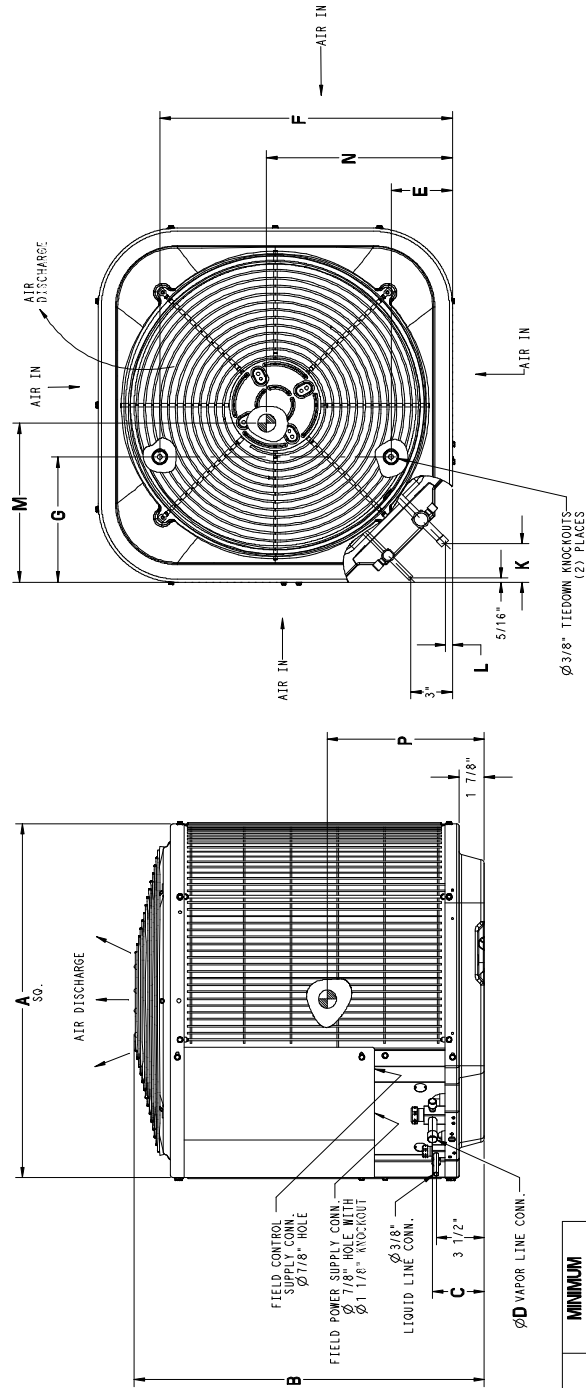
X = YES  
0 = NO

208-230-1-60

576

208/230-3-60

460-3-60



UNIT SIZE	MINIMUM MOUNTING PAD DIMENSIONS
18, 24, 30	23 1/2" X 23 1/2"
36	26" X 26"
48, 60	31 1/2" X 31 1/2"
-	35" X 35"

# Certified Drawing for AHU CU 10

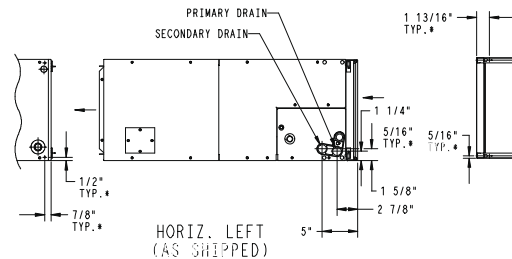
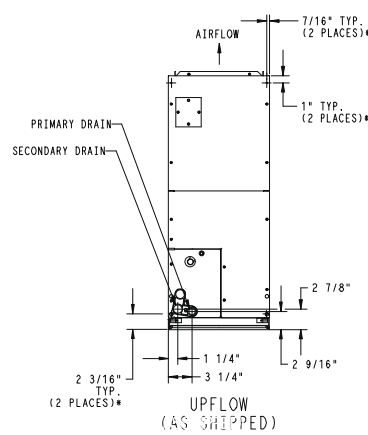
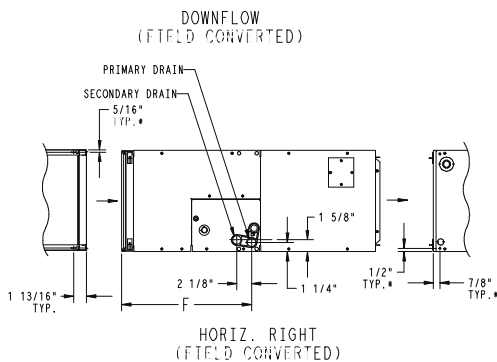
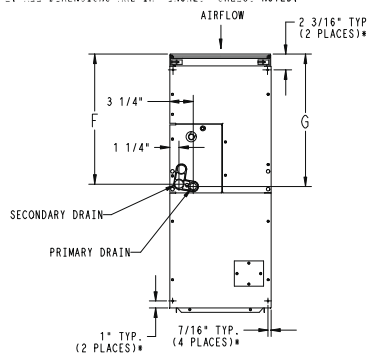
Project: ~Untitled65  
Prepared By:

05/30/2014

## DIMENSIONS (cont.)

### SLOPE COIL

- NOTES:  
1. CONDENSATE PAN DRAIN CAPS NOT SHOWN FOR CLARITY.  
2. ALL DIMENSIONS ARE IN "INCHES" UNLESS NOTED.



- \* HORIZONTAL MOUNT LOCATIONS - DIMPLES PROVIDED IN TOP PANEL, AND BACK OF CABINET. IN CABINET BOTTOM, HOLES PROVIDED .136" DIA. HORIZONTAL HANGING HARDWARE TO BE FIELD SUPPLIED.

### A-COIL

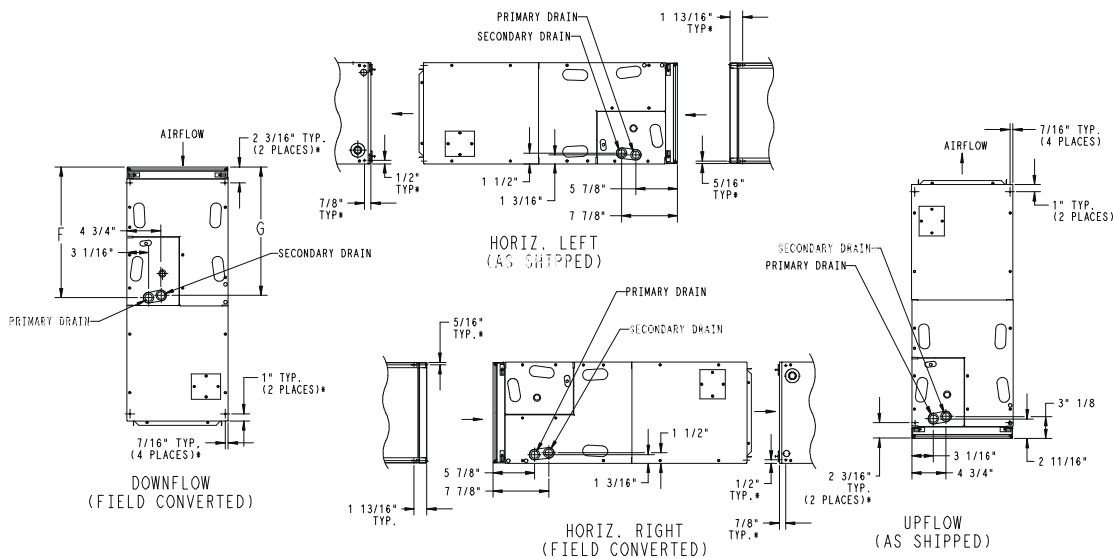


Fig 2 - FX4D - English

A10033

# Certified Drawing for AHU CU 10

Project: ~Untitled65  
Prepared By:

05/30/2014

## DIMENSIONS

UNIT	A	B	C	D	E	F	G	H	J	COIL CONFIGURATION SLOPE "A"	SHIPPING WT (LBS) NON TIN-COATED	SHIPPING WT (LBS) TIN-COATED
FX4DNF019	49 5/8"	17 5/8"	15 3/4"	15 5/8"	15 3/8"	23 1/8"	23 5/8"	—	17"	X	122	122
FX4DNF025	49 5/8"	17 5/8"	15 3/4"	15 5/8"	15 3/8"	23 1/8"	23 5/8"	—	17"	X	122	122
FX4DNF031	53 7/16"	21 1/8"	19 1/4"	19 1/8"	19 3/16"	26 15/16"	27 1/2"	—	19"	X	146	146
FX4DNF037	49 5/8"	21 1/8"	19 1/4"	19 1/8"	15 11/16"	23 7/16"	23 1/8"	—	—	X	157	157
FX4DNF043	49 5/8"	21 1/8"	19 1/4"	19 1/8"	15 11/16"	23 7/16"	23 1/8"	—	—	X	157	157
FX4DNF049	53 7/16"	24 11/16"	22 3/4"	22 11/16"	19 1/2"	27 1/4"	26 15/16"	—	—	X	185	185
FX4DNF061	59 3/16"	24 11/16"	22 3/4"	22 11/16"	25 1/4"	32 15/16"	32 5/8"	—	—	X	201	201

NOTE:

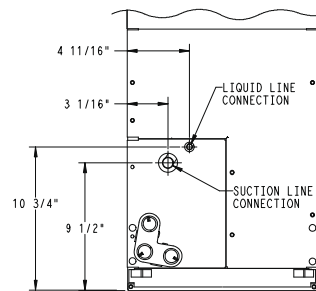
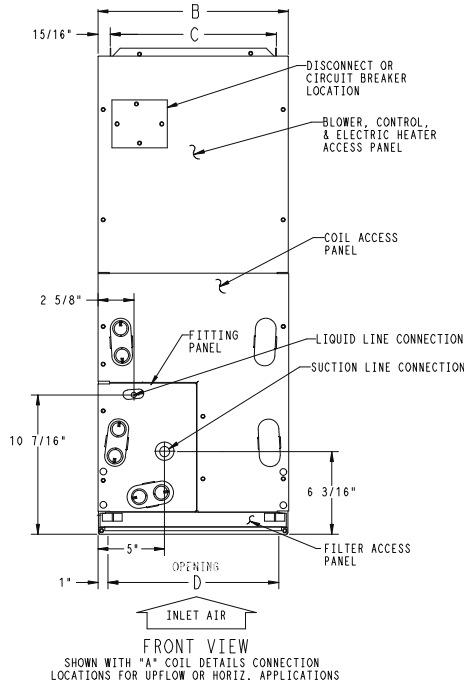
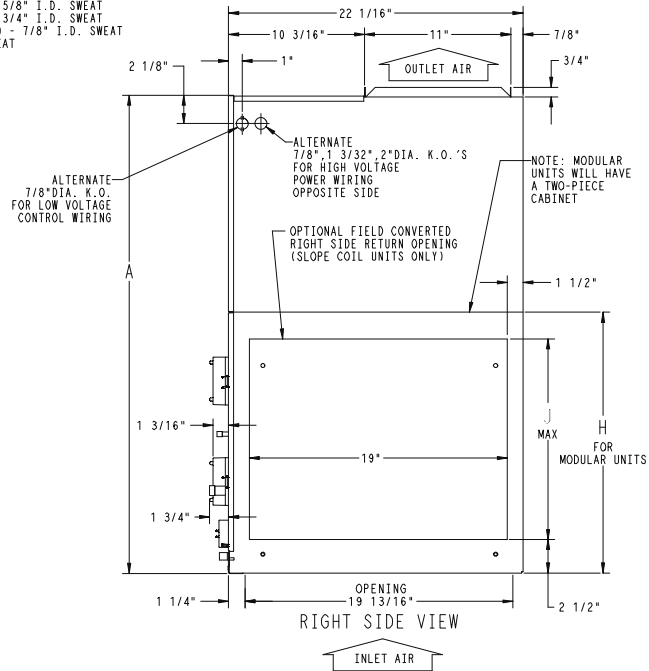
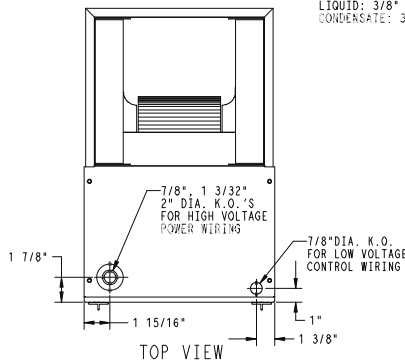
- SERIES DESIGNATION IS THE 14TH POSITION OF UNIT PRODUCT NUMBER
- ALL DIMENSIONS ARE IN "INCHES" UNLESS NOTED.

NOTE: ALLOW 21" FROM FRONT FOR SERVICE

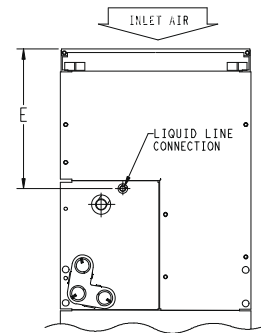
### UNIT CONNECTION SIZES

SUCTION: 018 & 024 - 5/8" I.D. SWEAT  
030 & 036 - 3/4" I.D. SWEAT  
042 THRU 060 - 7/8" I.D. SWEAT  
LIQUID: 3/8" I.D. SWEAT  
CONDENSATE: 3/4" FPT

FX4D



SLOPE COIL DETAILS  
CONNECTION LOCATIONS SHOWN  
FOR UPFLOW OR HORIZ.  
LEFT APPLICATIONS



ACCESS PANEL CONFIG. FOR  
SLOPE COILS  
DOWNFLOW OR HORIZ.  
RIGHT APPLICATIONS  
AND  
"A" COILS  
DOWNFLOW APPLICATIONS

Fig 1 - FXD - English

A10032

## Unit Report For AHU CU 12

Project: ~Untitled65  
Prepared By:

05/30/2014



### Outdoor Unit Parameters

Unit Model:.....**24ABB**  
Unit Size:.....**1.5 Tons**  
Voltage:.....**208/230-1-60** V-Ph-Hz

### Indoor Unit Parameters

Unit Model:.....**FX4D**  
Unit Size:.....**18,000 Btuh**  
Cabinet Insulation:**Single-piece cabinet with 1-in. super thick insulation**  
Voltage:.....**208/230-1-60** V-Ph-Hz  
Heating Size:.....**No Heat**

### Outdoor Unit Dimensions and Weight

Unit Length:.....**25** in  
Unit Width:.....**36** in  
Unit Height:.....**34** in  
Unit Shipping Weight:.....**130** lb

### Indoor Unit Dimensions and Weight

Unit Length:.....**22.06** in  
Unit Width:.....**18** in  
Unit Height:.....**50** in  
Unit Shipping Weight:.....**122** lb

### Warranty Information

#### OTHER RESIDENTIAL APPLICATIONS (Apartments, Rental Properties, etc.)

The warranty period is five (5) years on parts. The warranty is to the original owner only and is not transferable.

#### OTHER APPLICATIONS

The warranty period is five (5) years on the compressor, and one (1) year on all other parts. The warranty is to the original owner only and is not transferable.

### Ordering Information

Part Number	Description	Quantity
<b>Outdoor Unit</b>		
24ABB318A003	24ABB Comfort Series Air Conditioner with Puron Refrigerant 1.5 Tons Cooling	1
	13 SEER @ ARI Conditions	1
	Dense Grille	1
<b>Accessories</b>		
KAACH1401AAA	Crankcase Heater	1
KSALA0301410	Low-Ambient Pressure Switch	1
KAALP0401PUR	Low Pressure Switch	1
KAAWS0101AAA	Winter Start Control	1
<b>Indoor Unit</b>		
FX4DNF019L00	FX4D Comfort Series Fan Coil with Puron 18000 BTU Cooling	1
	Single-piece cabinet with 1-in. super thick insulation	1
	Aluminum	1
<b>Accessories</b>		
KFCEH0501N05	5 kW, Electric Heater, Non-fused, 1 phase, with relays	1

## Performance Summary For AHU CU 12

Project: ~Untitled65  
Prepared By:

05/30/2014

### System Performance

<b>System:</b> .....	<b>24ABB/FX4D</b>	Actual Airflow:.....	<b>525.0</b>	CFM
System Quantity:.....	<b>1</b>	Standard Airflow:.....	<b>525.0</b>	CFM
Altitude:.....	<b>0.0</b> ft	Total Net Clg Capacity:.....	<b>16.81</b>	MBH
Linear Pipe Length:.....	<b>0.0</b> ft	Net Sensible Clg Capacity:.....	<b>12.51</b>	MBH
SEER @ ARI Conditions:.....	<b>14.5</b>	Total System Power:.....	<b>1.48</b>	kW
EER @ ARI Conditions:.....	<b>12.0</b>			

### System Parameters

#### Outdoor Unit Parameters

Unit Model:.....**24ABB318A003**  
Unit Size (Nominal):.....**1.5 Tons**  
Voltage:.....**208/230-1-60** V-Ph-Hz  
Clg Ent Air DB Ambient:.....**95.0** °F

#### Indoor Unit Parameters

Unit Model:.....**FX4DNF019L00**  
Unit Size (Nominal):.....**18,000 Btuh**  
Voltage:.....**208/230-1-60** V-Ph-Hz  
Ent Air DB:.....**76.90** °F  
Ent Air WB:.....**64.00** °F  
Ent Enthalpy:.....**29.15** BTU/lb  
Lvg Air DB:.....**54.83** °F  
Lvg Air WB:.....**53.12** °F  
Lvg Enthalpy:.....**22.03** BTU/lb  
Heating Size (Nominal):.....**No Heat**  
Indoor Unit External Static:.....**0.50** in wg

### Electrical Data

#### Outdoor Electrical Data

Unit Voltage:.....**208/230-1-60** V-Ph-Hz  
Fan Motor FLA:.....**0.50** Amps  
MCA:.....**11.8** Amps  
Max Fuse:.....**20** Amps  
Operating Range Min:.....**197** V  
Operating Range Max:.....**253** V  
Compressor RLA:.....**9.0** Amps  
Compressor LRA:.....**48.0** Amps

#### Indoor Electrical Data:

(For units with no factory installed electric heaters)  
Unit Voltage:.....**208/230-1-60** V-Ph-Hz  
Unit FLA:.....**2.8** Amps  
Unit MCA:.....**3.5** Amps  
Unit MOCP:.....**15.0** Amps  
Unit Min Wire Size:.....**14.0**  
Motor HP:.....**1/3** HP  
**Notice: Indoor Elect. data is for 208/230-1-60 voltage**

#### Accessory Electric Heater Data

(Single point power for unit WITH electric heaters)

EH Part Number:.....**KFCEH0501N05**  
Electric Heater kW:.....**5.0** kW

#### For 2 wire operation (single circuit):

Heater Amps:.....**18.1/20.0** Amps  
Heater + Motor MCA:.....**26.0/28.4** Amps  
Heater + Motor MOCP:.....**30/30** Amps  
Accessory Voltage:.....**208/230-1-60** V-Ph-Hz

## Acoustic Summary For AHU CU 12

Project: ~Untitled65  
Prepared By:

05/30/2014

### Outdoor Unit Parameters:

Unit Model:.....**24ABB**  
Unit Size:.....**1.5 Tons**  
Variations:.....**Dense Grille**

Octave Band Center Frequency, Hz	63	125	250	500	1k	2k	4k	8k	dBA
Sound Power,dB	0.0	53.5	59.5	63.5	67.0	63.5	59.0	52.5	
A-Weighted Sound Power, dBA									72.0

### Indoor Unit Parameters:

Unit Model:.....**FX4D**  
Unit Size:.....**18,000 Btuh**  
Cabinet Insulation:.....**Single-piece cabinet with 1-in. super thick insulation**

Octave Band Center Frequency, Hz	63	125	250	500	1k	2k	4k	8k	dBA
Sound Power,dB	64.7	60.7	56.7	53.7	51.7	49.7	45.7	0.0	
A-Weighted Sound Power, dBA									0.0

24ABB3

# DIMENSIONS - ENGLISH

UNIT	SERIES	ELECTRICAL CHARACTERISTICS		A	B	C	D	E	F	G	K	L	M	N	P	OPERATING WEIGHT (lbs)	SHIPPING WEIGHT (lbs)	SHIPPING DIMENSIONS (L x W x H)	
24ABB318	2	X	0	0	23 1/8"	25 5/16"	3 3/4"	3/4"	4 7/16"	18 1/16"	7 13/16"	1/2"	16 1/2"	15"	12"	107	130	24 1/4" X 27 3/8" X 33 1/2"	
24ABB324	1	X	0	0	23 1/8"	25 5/16"	3 3/4"	3/4"	4 7/16"	18 1/16"	7 13/16"	1/2"	16 1/2"	15"	12"	110	134	24 1/4" X 27 3/8" X 33 1/2"	
24ABB330	1	X	0	0	23 1/8"	28 11/16"	3 3/4"	3/4"	4 7/16"	18 1/16"	7 13/16"	1/2"	16 1/2"	15"	14"	111	136	24 1/4" X 27 3/8" X 33 1/2"	
24ABB336	1, 2	X	X	X	25 3/4"	32 5/16"	3 7/8"	7/8"	4 7/16"	21 1/4"	9 1/8"	5/8"	14 1/4"	10 1/2"	16"	141	170	26 7/8" X 30 1/16" X 35 15/16"	
24ABB342	0, 1	X	0	X	31 3/16"	32 5/16"	3 7/8"	7/8"	6 9/16"	24 11/16"	9 1/8"	5/8"	15 3/4"	16 1/4"	13 3/4"	190	218	32 3/8" X 35 1/2" X 35 15/16"	
24ABB348	1, 2	X	X	X	31 3/16"	35 3/4"	3 7/8"	7/8"	6 9/16"	24 11/16"	9 1/8"	5/8"	16 3/8"	15 3/8"	15 1/4"	186	224	32 3/8" X 35 1/2" X 38 3/8"	
24ABB360	2	X	0	0	31 3/16"	25 1/2"	3 7/8"	7/8"	6 9/16"	24 11/16"	9 1/8"	5/8"	14 1/8"	15 3/8"	11 3/8"	190	226	32 3/8" X 35 1/2" X 32 9/16"	
24ABB360	2	0	X	X	31 3/16"	28 15/16"	3 7/8"	7/8"	6 9/16"	24 11/16"	9 1/8"	5/8"	16"	15 1/2"	12 3/4"	198	230	32 3/8" X 35 1/2" X 32 9/16"	

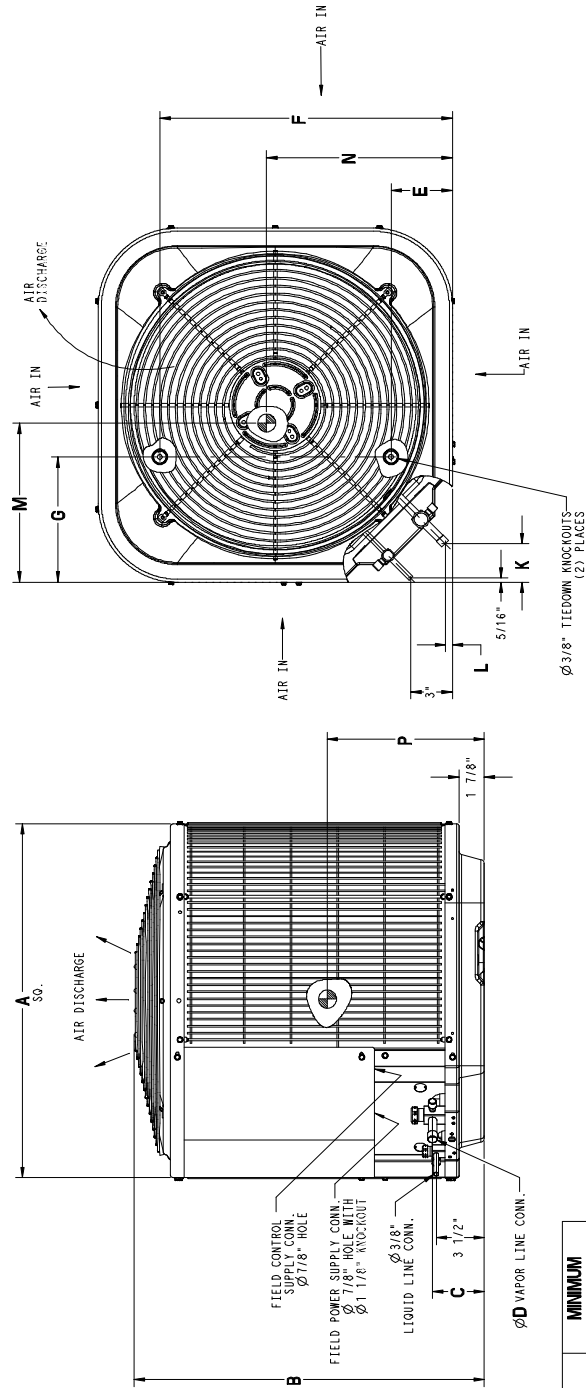
X = YES  
0 = NO

208-230-1-60

576

208/230-3-60

460-3-60



UNIT SIZE	MINIMUM MOUNTING PAD DIMENSIONS
18, 24, 30	23 1/2" X 23 1/2"
36	26" X 26"
48, 60	31 1/2" X 31 1/2"
-	35" X 35"



# Certified Drawing for AHU CU 12

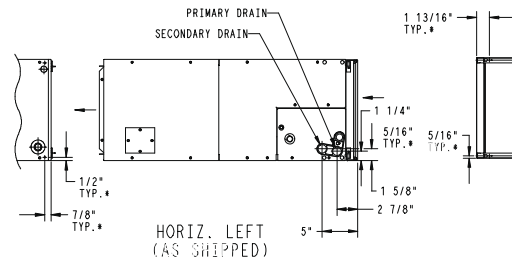
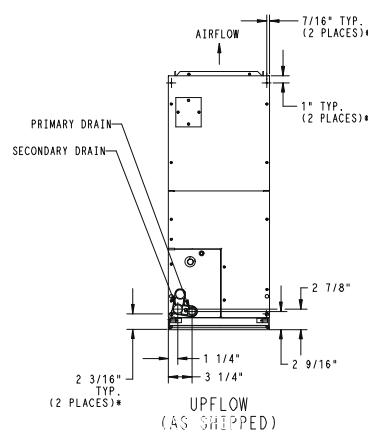
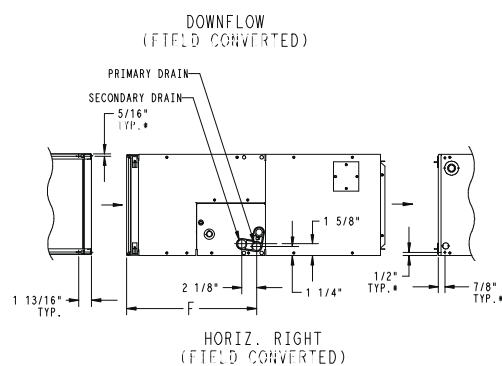
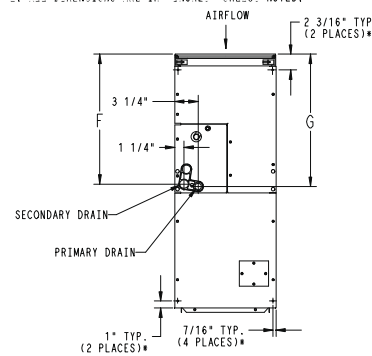
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Prepared By:

05/30/2014

## DIMENSIONS (cont.)

### SLOPE COIL

- NOTES:  
1. CONDENSATE PAN DRAIN CAPS NOT SHOWN FOR CLARITY.  
2. ALL DIMENSIONS ARE IN "INCHES" UNLESS NOTED.



- \* HORIZONTAL MOUNT LOCATIONS - DIMPLES PROVIDED IN TOP PANEL, AND BACK OF CABINET. IN CABINET BOTTOM. HOLES PROVIDED .136" DIA. HORIZONTAL HANGING HARDWARE TO BE FIELD SUPPLIED.

### A-COIL

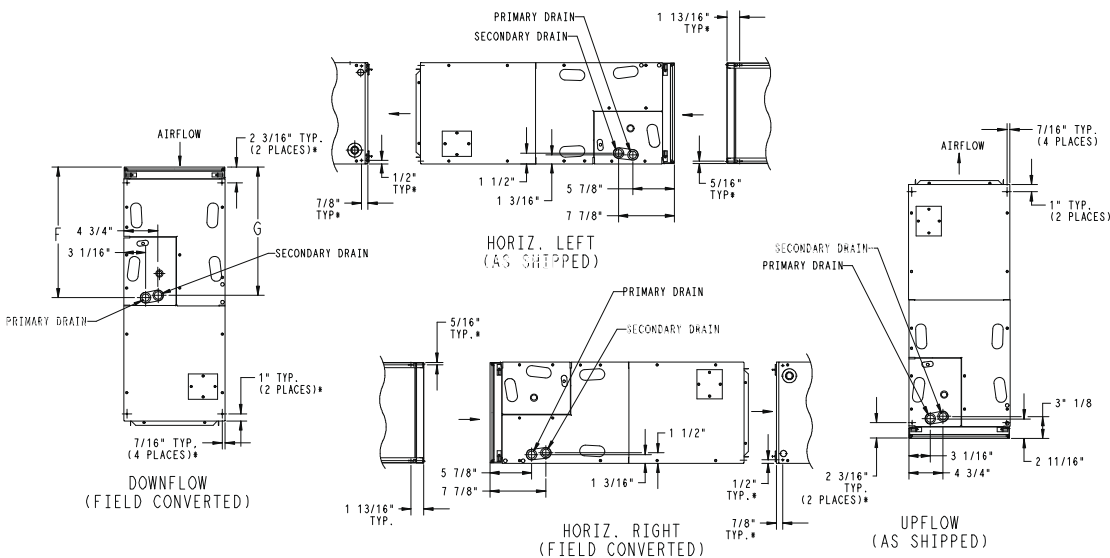


Fig 2 - FX4D - English

A10033

# Certified Drawing for AHU CU 12

Project: ~Untitled65  
Prepared By:

05/30/2014

## DIMENSIONS

UNIT	A	B	C	D	E	F	G	H	J	COIL CONFIGURATION SLOPE "A"	SHIPPING WT (LBS) NON TIN-COATED	SHIPPING WT (LBS) TIN-COATED
FX4DNF019	49 5/8"	17 5/8"	15 3/4"	15 5/8"	15 3/8"	23 1/8"	23 5/8"	—	17"	X	122	122
FX4DNF025	49 5/8"	17 5/8"	15 3/4"	15 5/8"	15 3/8"	23 1/8"	23 5/8"	—	17"	X	122	122
FX4DNF031	53 7/16"	21 1/8"	19 1/4"	19 1/8"	19 3/16"	26 15/16"	27 1/2"	—	19"	X	146	146
FX4DNF037	49 5/8"	21 1/8"	19 1/4"	19 1/8"	15 11/16"	23 7/16"	23 1/8"	—	—	X	157	157
FX4DNF043	49 5/8"	21 1/8"	19 1/4"	19 1/8"	15 11/16"	23 7/16"	23 1/8"	—	—	X	157	157
FX4DNF049	53 7/16"	24 11/16"	22 3/4"	22 11/16"	19 1/2"	27 1/4"	26 15/16"	—	—	X	185	185
FX4DNF061	59 3/16"	24 11/16"	22 3/4"	22 11/16"	25 1/4"	32 15/16"	32 5/8"	—	—	X	201	201

### NOTE:

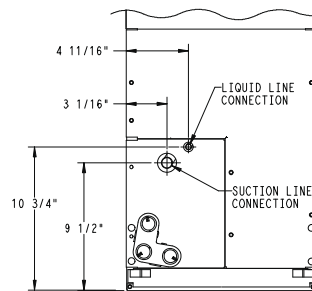
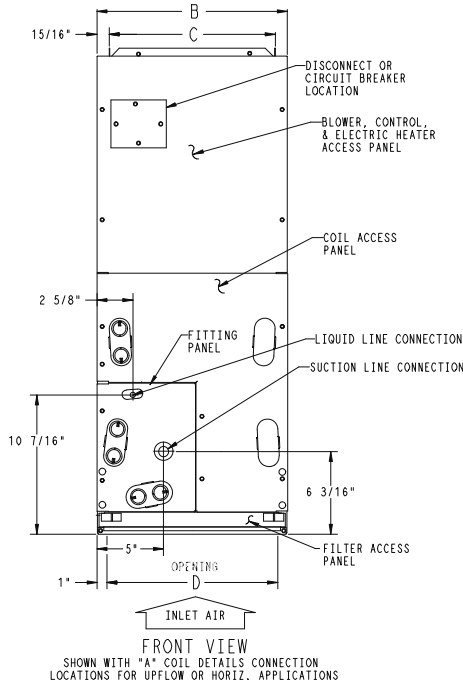
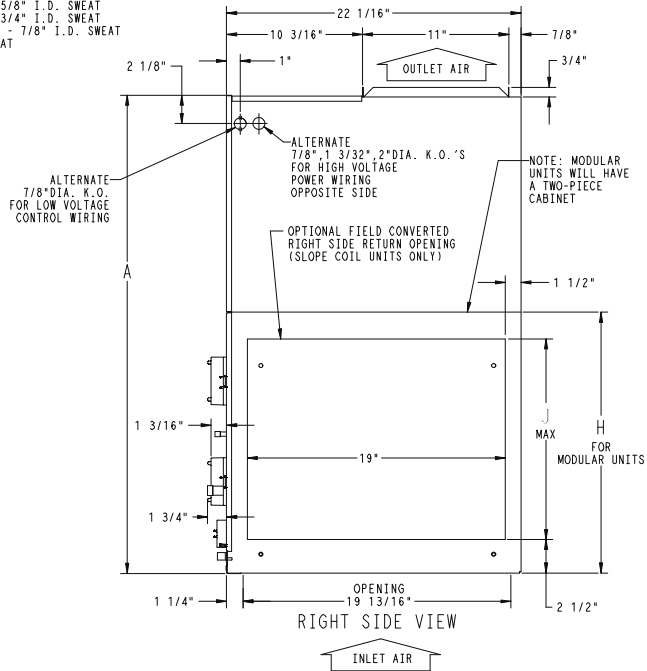
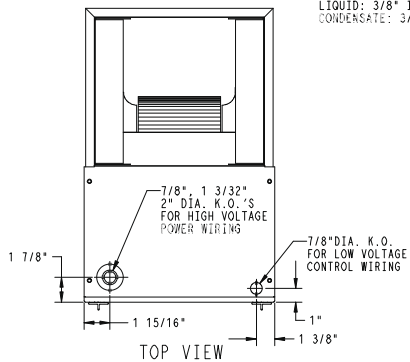
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- ALL DIMENSIONS ARE IN "INCHES" UNLESS NOTED.

NOTE: ALLOW 21" FROM FRONT FOR SERVICE

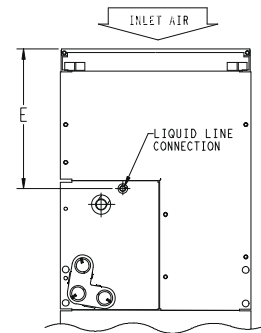
### UNIT CONNECTION SIZES

SUCTION: 018 & 024 - 5/8" I.D. SWEAT  
030 & 036 - 3/4" I.D. SWEAT  
042 THRU 060 - 7/8" I.D. SWEAT  
LIQUID: 3/8" I.D. SWEAT  
CONDENSATE: 3/4" FPT

FX4D



SLOPE COIL DETAILS  
CONNECTION LOCATIONS SHOWN  
FOR UPFLOW OR HORIZ.  
LEFT APPLICATIONS



ACCESS PANEL CONFIG. FOR  
SLOPE COILS  
DOWNFLOW OR HORIZ.  
RIGHT APPLICATIONS  
AND  
"A" COILS  
DOWNFLOW APPLICATIONS

Fig 1 - FXD - English

A10032

## GUIDE SPECIFICATIONS GENERAL 24ABB

### System Description

Outdoor-mounted, air-cooled, split-system air conditioner unit suitable for ground or rooftop installation. Unit consists of a hermetic compressor, an air-cooled coil, propeller-type condenser fan, and a control box. Unit will discharge supply air upward as shown on contract drawings. Unit will be used in a refrigeration circuit to match up to a packaged fan coil or coil unit.

### Quality Assurance

- Unit will be rated in accordance with the latest edition of ARI Standard 210.
- Unit will be certified for capacity and efficiency, and listed in the latest ARI directory.
- Unit construction will comply with latest edition of ANSI/ ASHRAE and with NEC.
- Unit will be constructed in accordance with UL standards and will carry the UL label of approval. Unit will have c-UL approval.
- Unit cabinet will be capable of withstanding Federal Test Method Standard No. 141 (Method 6061) 500-hr salt spray test.
- Air-cooled condenser coils will be leak tested at 150 psig and pressure tested at 450 psig.
- Unit constructed in ISO9001 approved facility.

### Delivery, Storage, and Handling

- Unit will be shipped as single package only and is stored and handled per unit manufacturer's recommendations.

### Warranty (for inclusion by specifying engineer)

- U.S. and Canada only.

## PRODUCTS

### AIR-COOLED, SPLIT-SYSTEM AIR CONDITIONER 24ABB 1-1/2 TO 5 NOMINAL TONS

### Equipment

- Factory assembled, single piece, air-cooled air conditioner unit. Contained within the unit enclosure is all factory wiring, piping, controls, compressor, refrigerant charge Puron® (R-410A), and special features required prior to field start-up.

### Unit Cabinet

- Unit cabinet will be constructed of galvanized steel, bonderized, and coated with a powder coat paint.

### Fans

- Condenser fan will be direct-drive propeller type, discharging air upward.
- Condenser fan motors will be totally enclosed, 1-phase type with class B insulation and permanently lubricated bearings. Shafts will be corrosion resistant.
- Fan blades will be statically and dynamically balanced.
- Condenser fan openings will be equipped with coated steel wire safety guards.

### Compressor

- Compressor will be hermetically sealed.
- Compressor will be mounted on rubber vibration isolators.

### Condenser Coil

- Condenser coil will be air cooled.
- Coil will be constructed of aluminum fins mechanically bonded to copper tubes which are then cleaned, dehydrated, and sealed.

### Refrigeration Components

- Refrigeration circuit components will include liquid-line shutoff valve with sweat connections, vapor-line shutoff valve with sweat connections, system charge of Puron® (R-410A) refrigerant, and compressor oil.
- Unit will be equipped with filter drier for Puron refrigerant.

### Operating Characteristics

- The capacity of the unit will meet or exceed \_\_\_\_\_ Btuh at a suction temperature of \_\_\_\_\_ °F. The power consumption at full load will not exceed \_\_\_\_\_ kW.
- Combination of the unit and the evaporator or fan coil unit will have a total net cooling capacity of \_\_\_\_\_ Btuh or greater at conditions of \_\_\_\_\_ CFM entering air temperature at the evaporator at \_\_\_\_\_ °F wet bulb and \_\_\_\_\_ °F dry bulb, and air entering the unit at \_\_\_\_\_ °F.
- The system will have a SEER of \_\_\_\_\_ Btuh/watt or greater at DOE conditions.

### Electrical Requirements

- Nominal unit electrical characteristics will be \_\_\_\_\_ v, single phase, 60 hz. The unit will be capable of satisfactory operation within voltage limits of \_\_\_\_\_ v to \_\_\_\_\_ v.
- Unit electrical power will be single point connection.
- Control circuit will be 24v.

### Special Features

- Refer to section of this literature identifying accessories and descriptions for specific features and available enhancements.

## Guide Specifications – Fan Coils – Fixed Speed

**Guide Specifications** for \_\_\_\_\_.  
(See the most recent edition of publication \_\_\_\_\_ for data for the specific model to be specified).

**Furnish and Install** \_\_\_\_\_ direct expansion fan coil(s) equipped with cooling control kit and \_\_\_\_\_(with) \_\_\_\_\_(without) electric heater in the location and manner shown on the plan. Unit shall operate properly in \_\_\_\_\_(vertical upflow) \_\_\_\_\_(horizontal right) \_\_\_\_\_(horizontal left) \_\_\_\_\_(vertical downflow) position and is to be installed with ductwork. Total cooling capacity shall be \_\_\_\_\_ Btuh or greater, and sensible heat capacity shall be \_\_\_\_\_ Btuh or greater, at conditions of \_\_\_\_\_ cfm, \_\_\_\_\_ degree F wb \_\_\_\_\_ degree F db air entering unit, and a coil refrigerant temperature of \_\_\_\_\_ degree F.

**Efficiency** shall be \_\_\_\_\_ when matched with outdoor unit \_\_\_\_\_ (per ARI ratings certification).

**Unit enclosure** shall be insulated with a 1 inch foil faced, high density, R4.2 insulation, and be constructed of prepainted galvanized steel. Large front service access panels shall provide easy access to all components. Unit shall be \_\_\_\_\_ (factory), \_\_\_\_\_ (field) equipped with reusable type filters. Filter shall be \_\_\_\_\_ inches (X) \_\_\_\_\_ inches.

**Fan** shall be forward curved with double inlet, mounted on motor shaft, dynamically and statically balanced. The fan shall deliver \_\_\_\_\_ cfm with \_\_\_\_\_ in. wg external static pressure operating at \_\_\_\_\_ hp. Fan-motor assembly shall be removable for service. Blower motor shall be induction type, of \_\_\_\_\_ hp.

**Cooling coil** shall have a face area of not less than \_\_\_\_\_ sq. ft. and be constructed with brazed copper tubing with aluminum lanced fins. Coil shall have TXV ( thermal expansion valve); refrigerant line fittings which permit braze connections. Condensate pans shall be equipped with primary and auxiliary drain connections with brass inserts, sloping, with minimal standing water retention. Refrigerant to be used will be \_\_\_\_\_(R-22) \_\_\_\_\_(R-410a).

**Blower controls** include control board with time delay relay, a 5 amp replaceable automotive-type circuit protection fuse, and motor speed tap selection terminal (SPT).

**Electric heater** \_\_\_\_\_ shall be \_\_\_\_\_(factory) \_\_\_\_\_(field) installed wired for \_\_\_\_\_(single) \_\_\_\_\_(multiple) supply circuit and \_\_\_\_\_(single) \_\_\_\_\_(3-phase) operation on fixed speed fan coil units. Standard heater control wiring shall be single stage with optional multiple staging capability. All heaters shall be equipped with thermal overload device, current overload for heater above 10 kw.

**Cooling control system** includes 40-VA control circuit (24 v) transformer, with replaceable 5 amp blade-type auto fuse. Low voltage connections shall be point-to-point “wire” connections.

**Maximum dimensions:** length \_\_\_\_\_ inches; width \_\_\_\_\_ inches; height \_\_\_\_\_ inches.

**Electrical requirements:** \_\_\_\_\_ volts, \_\_\_\_\_(single phase) \_\_\_\_\_(three phase) , frequency \_\_\_\_\_(60) \_\_\_\_\_(50) hertz.

**APPROVED**



# HVAC Submittal Cover Sheet

**SECTION: 2**

**PRODUCT: Roof Top Unit**

Paulson-Cheek Mechanical, Inc.  
6145 Norhtbelt Parkway, Suite F  
Norcross, GA 30071

PHONE: 770-729-0076

FAX: 770-729-1076

PROJECT: **Saint Michael The Archangel  
Catholic Church**

LOCATION: **Woodstock, GA**

Paulson-Cheek Mechanical, Inc.

ARCHITECT'S/ENGINEER'S STAMP

**Paulson-Cheek Mechanical, Inc.**

DATE RECEIVED: 05/30/14  
MANUFACTURER: Carrier  
SUPPLIER: Mingledorff's  
SUBMITTED DATE: 05/30/14

☒ NO ERRORS DETECTED

☐ CORRECT EXCEPTIONS NOTED

THIS APPROVAL OF SHOP DRAWINGS DOES  
NOT RELIEVE THE SUBCONTRACTOR OR VENDOR  
FROM THE REQUIREMENTS OF THE CONTRACT  
DOCUMENTS.

CHECKED BY: Carden Clark  
DATE CHECKED: 02/04/14

## Unit Report For RTU-1

Project: ~Untitled65  
Prepared By:

05/30/2014  
10:46AM

### Unit Parameters

Unit Model:.....**50ES-A36---6**  
Unit Size:.....**36 (3 Tons)**  
Volts-Phase-Hertz:.....**460-3-60**  
Heating Type:.....**Electric**  
Duct Cfg:.....**Vertical Supply / Vertical Return**

### Dimensions (ft. in.) & Weight (lb.) \*\*\*

Unit Length:.....**4' 0.1875"**  
Unit Width:.....**2' 8.625"**  
Unit Height:.....**3' 10"**

\*\*\* Weights and Dimensions are approximate. Weight does not include roof curbs, unit packaging, field installed accessories or factory installed options. Approximate dimensions are provided primarily for shipping purposes. For exact dimensions and weights, refer to appropriate product data catalog.

Total Operating Weight:.....**290 lb**

### Warranty Information

1 year warranty on parts  
5 year warranty on compressor

No optional warranties were selected.

**NOTE: Please see Warranty Catalog 500-089 for explanation of policies and ordering methods.**

### Ordering Information

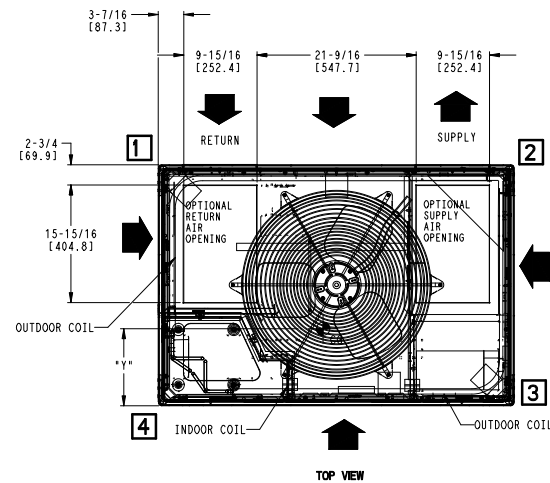
Part Number	Description	Quantity
50ES-A36---6	Rooftop Unit	1
<b>Accessories</b>		
CPMANDPR007A00	Manual Outside Air Damper	1
CPFILTRK007A00	Internal Filter Rack	1
CPLOUVER018A00	Louvered Metal Outdoor Coil Grilles	1
CPRFCURB011A00	14 inch Common Flat Roof Curb	1
CPHEATER062A00	11.3/15.0 kW, 460/480-3-60 volt, Electric Heater	1

# Certified Drawing for RTU-1

Project: ~Untitled65  
Prepared By:

05/30/2014  
10:46AM

UNITED TECHNOLOGIES CARRIER P.O. BOX 4808 SYRACUSE, NY 13221 THIS DOCUMENT IS THE PROPERTY OF CARRIER CORPORATION AND IS DELIVERED UPON THE EXPRESS CONDITION THAT THE CONTENTS WILL NOT BE DISCLOSED OR USED WITHOUT CARRIER CORPORATION'S WRITTEN CONSENT. SUBMISSION OF THESE DRAWINGS OR DOCUMENTS DOES NOT CONSTITUTE PART PERFORMANCE OR ACCEPTANCE OF CONTRACT.



UNIT	ELECTRICAL CHARACTERISTICS	UNIT WT.		UNIT HEIGHT	CENTER OF GRAVITY IN/MM						
		LB	KG		"A"		X		Y		Z
50ES-A24---30	208/230-1-60	272	123.3	40-1/8	1019	20-1/2	520.7	15-3/4	400.1	16-1/2	419.1
50ES-A30---(3/5)0	208/230-1,208/230-3-60	277	125.5	42-1/8	1070	20-1/2	520.7	15-3/4	400.1	16-13/16	427.0
50ES-A36---(3/5)0	208/230-1,208/230-3-60	283	128.3	46-1/8	1172	20-1/2	520.7	15-3/4	400.1	17	431.8
50ES-A36---60	460-3-60	297	134.6	46-1/8	1172	20-1/2	520.7	15-3/4	400.1	17	431.8

UNITS	VOLTAGE	CORNER WEIGHT LB/KG			
50ES-A24---30	208/230	54.4	24.7	43.5	19.7
50ES-A30---(3/5)0	208/230	55.4	25.1	44.3	20.1
50ES-A36---(3/5)0	208/230	56.6	25.7	45.2	20.5
50ES-A36---60	460	56.6	25.7	45.2	20.5

NOTE: ALL TABLE DATA RELEVANT FOR ALL FACTORY INSTALLED OPTIONS EXCEPT ECONOMIZER

## REQUIRED CLEARANCES TO COMBUSTIBLE MATL.

	INCHES [MM]
TOP OF UNIT.....	14 [355.6]
DUCT SIDE OF UNIT.....	2 [50.8]
SIDE OPPOSITE DUCTS.....	14 [355.6]
BOTTOM OF UNIT.....	0 [0.0]
ELECTRICAL PANEL.....	36 [914.4]

## NEC REQUIRED CLEARANCES.

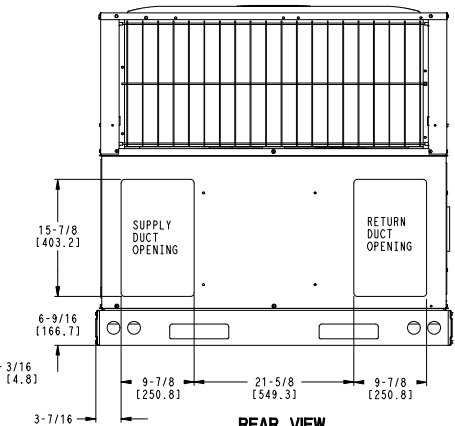
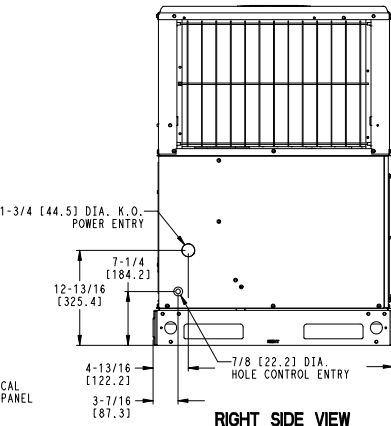
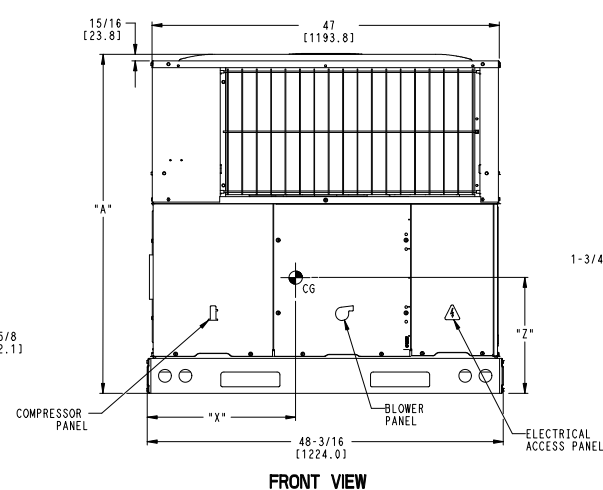
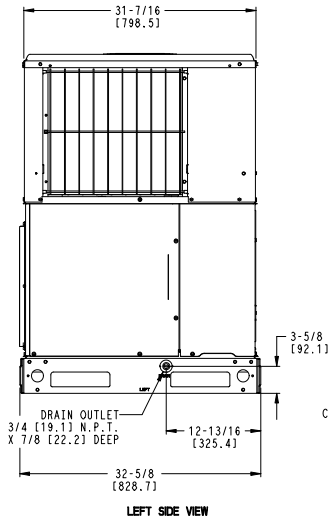
	INCHES [MM]
BETWEEN UNITS, POWER ENTRY SIDE.....	42 [1066.8]
UNIT AND UNGROUNDED SURFACES, POWER ENTRY SIDE.....	36 [914.0]
UNIT AND BLOCK OR CONCRETE WALLS AND OTHER GROUNDED SURFACES, POWER ENTRY SIDE.....	42 [1066.8]

## REQUIRED CLEARANCE FOR OPERATION AND SERVICING

	INCHES [MM]
EVAP. COIL ACCESS SIDE.....	36 [914.0]
POWER ENTRY SIDE.....	42 [1066.8]
(EXCEPT FOR NEC REQUIREMENTS)	
UNIT TOP.....	48 [1219.2]
SIDE OPPOSITE DUCTS.....	36 [914.0]
DUCT PANEL.....	12 [304.8]

\*MINIMUM DISTANCES: IF UNIT IS PLACED LESS THAN 12 [304.8] FROM WALL SYSTEM, THEN SYSTEM PERFORMANCE MAYBE COMPROMISED.

DIMENSIONS IN [ ] ARE IN MILLIMETERS



DATE	SUPERCEDES	SINGLE ZONE ELECTRIC COOLING & HEAT(SM)	50ES500151	REV
07/24/09	-			3.0

## Performance Summary For RTU-1

Project: ~Untitled65  
Prepared By:

05/30/2014  
10:46AM

### Part Number:50ES-A36---6

ARI SEER:.....13.00

#### Base Unit Dimensions

Unit Length:.....48.2 in  
Unit Width:.....32.6 in  
Unit Height:.....46.0 in  
Total Operating Weight:.....290 lb

#### Unit

Unit Voltage-Phase-Hertz:.....460-3-60  
Air Discharge:.....Vertical  
Fan Drive Type:.....Direct  
Actual Airflow:.....1293 CFM  
Site Altitude:.....0 ft

#### Cooling Performance

Condenser Entering Air DB:.....95.0 F  
Evaporator Entering Air DB:.....78.1 F  
Evaporator Entering Air WB:.....64.9 F  
Entering Air Enthalpy:.....29.82 BTU/lb  
Evaporator Leaving Air DB:.....61.0 F  
Evaporator Leaving Air WB:.....56.5 F  
Evaporator Leaving Air Enthalpy:.....24.08 BTU/lb  
Net Cooling Capacity:.....33.39 MBH  
Net Sensible Capacity:.....23.84 MBH  
Total Unit Power Input:.....3.16 kW  
Coil Bypass Factor:.....0.046

#### Heating Performance

Heating Airflow:.....1293 CFM  
Entering Air Temp:.....70.0 F  
Leaving Air Temp:.....97.6 F  
Electric Heating Capacity:.....11.30 kW

#### Supply Fan

External Static Pressure:.....0.50 in wg  
Options / Accessories Static Pressure  
Electric Heaters:.....0.06 in wg  
Filter:.....0.13 in wg  
Wet Coil:.....0.10 in wg  
Total External Static:.....0.78 in wg  
Fan RPM:.....1000  
Fan Power:.....0.66 BHP  
Fan Motor Size, hp:.....3/4  
NOTE:.....Med-High Motor Speed, Vert

#### Electrical Data

Minimum Voltage:.....414  
Maximum Voltage:.....506  
Compressor RLA:.....5.8  
Compressor LRA:.....38  
Actual Electric Heater kW:.....15  
Electric Heater FLA:.....18  
Outdoor Fan FLA (ea):.....0.5  
Indoor Fan Motor FLA:.....3  
Power Supply MCA:.....26.3  
Power Supply MOCP (Fuse or HACR):.....30

Control Panel SCCR: 5kA RMS at Rated Symmetrical Voltage



## Performance Summary For RTU-1

Project: ~Untitled65  
Prepared By:

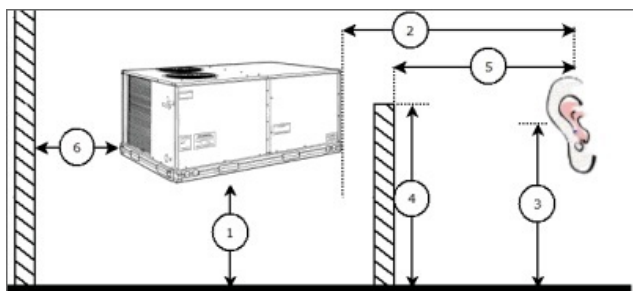
05/30/2014  
10:46AM

### Acoustics

Sound Rating: ..... **75.0** db  
Sound Power Levels, db re 10E-12 Watts

	Discharge	Inlet	Outdoor
63 Hz	NA	NA	NA
125 Hz	NA	NA	64.0
250 Hz	NA	NA	63.5
500 Hz	NA	NA	68.0
1000 Hz	NA	NA	70.5
2000 Hz	NA	NA	64.5
4000 Hz	NA	NA	61.0
8000 Hz	NA	NA	61.0

### Advanced Acoustics



#### Advanced Acoustics Parameters

1. Unit height above ground: ..... **30.0** ft
2. Horizontal distance from unit to receiver: ..... **50.0** ft
3. Receiver height above ground: ..... **5.7** ft
4. Height of obstruction: ..... **0.0** ft
5. Horizontal distance from obstruction to receiver: ..... **0.0** ft
6. Horizontal distance from unit to obstruction: ..... **0.0** ft

### Detailed Acoustics Information

Octave Band Center Freq. Hz	63	125	250	500	1k	2k	4k	8k	Overall
A	0.0	64.0	63.5	68.0	70.5	64.5	61.0	61.0	74.4 Lw
B	- 26.2	47.9	54.9	64.8	70.5	65.7	62.0	59.9	73.2 LwA
C	0.0	31.6	31.1	35.6	38.1	32.1	28.6	28.6	42.0 Lp
D	- 26.2	15.5	22.5	32.4	38.1	33.3	29.6	27.5	40.8 LpA

#### Legend

- A Sound Power Levels at Unit's Acoustic Center, Lw
- B A-Weighted Sound Power Levels at Unit's Acoustic Center, LwA
- C Sound Pressure Levels at Specific Distance from Unit, Lp
- D A-Weighted Sound Pressure Levels at Specific Distance from Unit, LpA

Calculation methods used in this program are patterned after the ASHRAE Guide; other ASHRAE Publications and the AHRI Acoustical Standards. While a very significant effort has been made to insure the technical accuracy of this program, it is assumed

## Performance Summary For RTU-1

Project: ~Untitled65  
Prepared By:

05/30/2014  
10:46AM

that the user is knowledgeable in the art of system sound estimation and is aware of the tolerances involved in real world acoustical estimation. This program makes certain assumptions as to the dominant sound sources and sound paths which may not always be appropriate to the real system being estimated. Because of this, no assurances can be offered that this software will always generate an accurate sound prediction from user supplied input data. If in doubt about the estimation of expected sound levels in a space, an Acoustical Engineer or a person with sound prediction expertise should be consulted.



## HVAC Guide Specifications

### Packaged Electric Cooling Unit Constant Volume Application

**Size Range: 2 to 5 Tons, Nominal Cooling**

**Carrier Model Number: 50ES-A**

#### Part 1 — General

##### SYSTEM DESCRIPTION

Outdoor rooftop mounted or ground mounted, electric cooling unit utilizing a hermetic scroll compressor for cooling duty. Unit shall discharge supply air vertically or horizontally as shown on contract drawings. Condenser fan/coil section shall have a draw--thru design with vertical discharge for minimum sound levels.

##### QUALITY ASSURANCE

- A. Unit shall be rated in accordance with ARI Standards 210/240 and 270.
- B. Unit shall be designed in accordance with UL Standard 1995.
- C. Unit shall be manufactured in a facility registered to ISO 9001 manufacturing quality standard.
- D. Unit shall be UL listed and c--UL certified as a total package for safety requirements.
- E. Roof curb shall be designed to conform to NRCA Standards.
- F. Insulation and adhesives shall meet NFPA 90A requirements for flame spread and smoke generation.
- G. Cabinet insulation shall meet ASHRAE Standard 62P.

##### DELIVERY, STORAGE AND HANDLING

Unit shall be stored and handled per manufacturer's recommendations.

#### Part 2 — Products

##### EQUIPMENT

###### A. General:

Factory-assembled, single-piece, heating and cooling unit. Contained within the enclosure shall be all factory wiring, piping, controls, and refrigerant charge with R-410-A, and special features required prior to field start--up.

###### B. Unit Cabinet:

## Guide Specification for RTU-1

Project: ~Untitled65  
Prepared By:

05/30/2014  
10:46AM

1. Unit cabinet shall be constructed of phosphated, zinc--coated, pre--painted steel capable of with--standing 500 hours in salt spray.
2. Normal service shall be through a 3 removable cabinet panels.
3. The unit shall be constructed on a rust proof unit base that has an externally trapped, integrated sloped drain.
4. Evaporator fan compartment top surface shall be insulated with a minimum 1/2--in. (12.7 mm) thick, flexible fiberglass insulation, coated on the air side and retained by adhesive and mechanical means. The evaporator wall sections will be insulated with a minimum semi--rigid foil--faced board capable of being wiped clean. Aluminum foil-faced fiberglass insulation shall be used in the entire indoor air cavity section.
5. 5. Unit shall have a field--supplied condensate trap.

### C. Fans:

1. The evaporator fan motor shall be high efficiency brushless direct--drive multi--speed motor and control, as shown on equipment drawings.
2. Fan wheel shall be made from steel, be double--inlet type with forward curved blades with corrosion resistant finish. Fan wheel shall be dynamically balanced.
3. Condenser fan shall be direct drive propeller type with aluminum blades riveted to corrosion resistant steel spiders, be dynamically balanced, and discharge air vertically.

### D. Compressor:

1. Fully hermetic compressors with factory--installed vibration isolation.
2. Scroll compressors shall be standard on all units.

### E. Coils:

Evaporator and condenser coils shall have aluminum plate fins mechanically bonded to seamless copper tubes with all joints brazed. Tube sheet openings shall be belled to prevent tube wear.

### F. Refrigerant Components:

Refrigerant expansion device shall be of the TXV (thermostatic expansion valve) type.

### G. Filters:

Filter section shall consist of field--installed, throwaway, 1-in. (25 mm) thick fiberglass filters of commercially available sizes.

### H. Controls and Safeties:

1. Unit controls shall be complete with a self--contained low voltage control circuit.
2. Units shall incorporate high and low pressure switches.

### I. Operating Characteristics:

1. Unit shall be capable of starting and running at 125\_F (51\_C) ambient outdoor temperature per maximum load criteria of ARI Standard 210.
2. Compressor with standard controls shall be capable of operation down to 40\_F (4\_C) ambient outdoor temperature.
3. Unit shall be provided with 60--second fan time delay after the thermostat is satisfied.

### J. Electrical Requirements:

All unit power wiring shall enter the unit cabinet at a single location.

### K. Motors:

1. Compressor motors shall be of the refrigerant--cooled type with line--break thermal and current overload protection.
2. All fan motors shall have permanently lubricated bearings, and inherent, automatic reset, thermal overload protection.
3. Condenser fan motor shall be totally enclosed.
4. Evaporator fan motor to be high efficiency brushless DC motor.

### L. Special Features:

#### 1. Coil Options:

Base unit with tin plated indoor coil hairpins available as a factory installed option.

#### 2. Compressor Start Kit (single phase units only):

Shall provide additional starting torque for single-phase compressors.

#### 3. Thermostat:

To provide for one-stage heating and cooling in addition manual or automatic changeover and indoor fan control.

#### 4. Crankcase Heater:

Shall provide anti-flood back protection for low-load cooling applications.

#### 5. Economizer:

- a. Economizer controls capable of providing free cooling using outside air.
- b. Equipped with low leakage dampers not to exceed 3% leakage, at 1.0 IN. W.C. pressure differential.
- c. Spring return motor shuts off outdoor damper on power failure.

#### 6. Electric Heaters:

- a. Electric heater shall be available as a field--installed option.
- b. Heater elements shall be open wire type, adequately supported and insulated with ceramic bushings.
- c. Electric heater packages must provide single point power connection capability.

#### 7. Filter Rack Kit:

Shall provide filter mounting for downflow applications.

#### 8. Flat Roof Curb:

Curbs shall have seal strip and a wood nailer for flashing and shall be installed per manufacturer's instructions.

#### 9. Low Ambient Package:

Shall consist of a solid--state control and condenser coil temperature sensor for controlling condenser--fan motor operation, which shall allow unit to operate down to 0\_F (-17\_C) outdoor ambient temperature when properly installed.

#### 10. Louvered Grille:

Wire grille shall be standard on all units. Louvered grille shall be available as a field--installed option to provide hail guard and vandalism protection.

#### 11. Manual Outdoor Air Damper:

Package shall consist of damper, birdscreen, and rainhood which can be preset to admit outdoor air for year--round ventilation.

#### 12. Square--To--Round Duct Transitions (24-48 size):

Shall have the ability to convert the supply and return openings from rectangular to round.

#### 13. Time Guard II

Automatically prevents the compressor from restarting for at least 4 minutes and 45 seconds after shutdown of the compressor. Not required when a corporate programmable thermostat is applied or with a RTU--MP control.



**APPROVED**

# HVAC Submittal Cover Sheet

**SECTION: 3**

**PRODUCT: Ductless Split System**

Paulson-Cheek Mechanical, Inc.  
6145 Norhtbelt Parkway, Suite F  
Norcross, GA 30071

PHONE: 770-729-0076

FAX: 770-729-1076

PROJECT: **Saint Michael The Archangel  
Catholic Church**

LOCATION: **Woodstock, GA**

Paulson-Cheek Mechanical, Inc.

ARCHITECT'S/ENGINEER'S STAMP

## Paulson-Cheek Mechanical, Inc.

DATE RECEIVED:	05/30/14
MANUFACTURER:	Mitsubishi
SUPPLIER:	Mingledorff's
SUBMITTED DATE:	05/30/14

☒ NO ERRORS DETECTED

☐ CORRECT EXCEPTIONS NOTED

THIS APPROVAL OF SHOP DRAWINGS DOES  
NOT RELIEVE THE SUBCONTRACTOR OR VENDOR  
FROM THE REQUIREMENTS OF THE CONTRACT  
DOCUMENTS.

CHECKED BY:	Carden Clark
DATE CHECKED:	02/04/14

**SUBMITTAL DATA: PKA-A12HA & PUY-A12NHA3**

12,000 BTU/H WALL-MOUNTED AIR-CONDITIONING SYSTEM

Job Name:	Location:	Date:
Purchaser:	Engineer:	
Submitted to:	For <input type="checkbox"/> Reference <input type="checkbox"/> Approval <input type="checkbox"/> Construction	
Unit Designation:	Schedule No.:	

**GENERAL FEATURES**

- Wall-mounted indoor unit for residential and commercial applications
- Shiny-white-exterior plastic; compact design
- Quiet operation—both indoor and outdoor units
- PAR-21MAA wired remote controller is included
- Self-check function—integrated diagnostics
- Limited warranty: five years on parts and defects and seven years on compressors

**OPTIONAL ACCESSORIES**
**Indoor Unit**

- Remote Temperature Sensor (PAC-SE41TS-E)

**Outdoor Unit**

- M-NET Adapter (PAC-SF81MA-E)
- Air Outlet Guide (PAC-SG58SG-E)
- Wind Baffle (WB-PA1)

**Cooling\***

Rated Capacity ..... 12,000 Btu/h  
Minimum Capacity ..... 6,000 Btu/h  
SEER ..... 15.2  
Total Input ..... 1,190 W

\* Rating Conditions (Cooling) - Indoor: 80°F (27°C) DB / 67°F (19°C) WB.  
Outdoor: 95°F (35°C) DB / 75°F (24°C) WB.

**Electrical Requirements**

Power Supply ..... 208 / 230V, 1-Phase, 60 Hz  
Breaker Size ..... 15 A

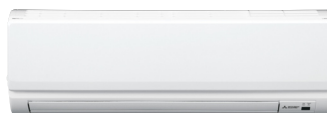
**Voltage**

Indoor - Outdoor S1-S2 ..... AC 208 / 230V  
Indoor - Outdoor S2-S3 ..... DC 24V  
Indoor - Remote Controller ..... DC 12V

**OPERATING RANGE**

		Indoor Intake Air Temp.	Outdoor Intake Air Temp.
Cooling	Maximum	95°F (35°C) DB, 71°F (22°C) WB	115°F (46°C) DB
	Minimum	67°F (19°C) DB, 57°F (14°C) WB	0°F** (-18°C) DB

\*\* With optional wind baffle accessory installed. If not installed, the minimum temperature will be 23°F (-5°C) DB.



Indoor Unit: PKA-A12HA


Remote Controller:  
PAR-21MAA


Outdoor Unit: PUY-A12NHA3

**Indoor Unit**

MCA ..... 1 A  
Fan Motor ..... 0.33 F.L.A.  
Fan Motor Output ..... 30 W  
Airflow (Lo - Mid - Hi) ..... 320 - 370 - 425 Dry CFM  
290 - 335 - 380 Wet CFM  
Air Filter ..... Polypropylene Honeycomb  
Sound Pressure Level (Lo - Mid - Hi) ..... 36 - 40 - 43 dB(A)

DIMENSIONS	UNIT INCHES / MM
W	35-3/8 / 898
D	9-13/16 / 249
H	11-5/8 / 295

Weight ..... 29 lbs. / 13 kg  
External Finish ..... Munsell No. 1.0Y 9.2 / 0.2  
Field Drainpipe Size O.D. .... 5/8" / 16 mm  
Wall-mounted Remote Controller. .... PAR-21MAA  
(See Data Submittal Sheet)

**Outdoor Unit**

Compressor ..... DC Inverter-driven Twin Rotary  
MCA ..... 13 A  
Fan Motor ..... 0.35 F.L.A.  
Sound Pressure Level  
Cooling ..... 46 dB(A)

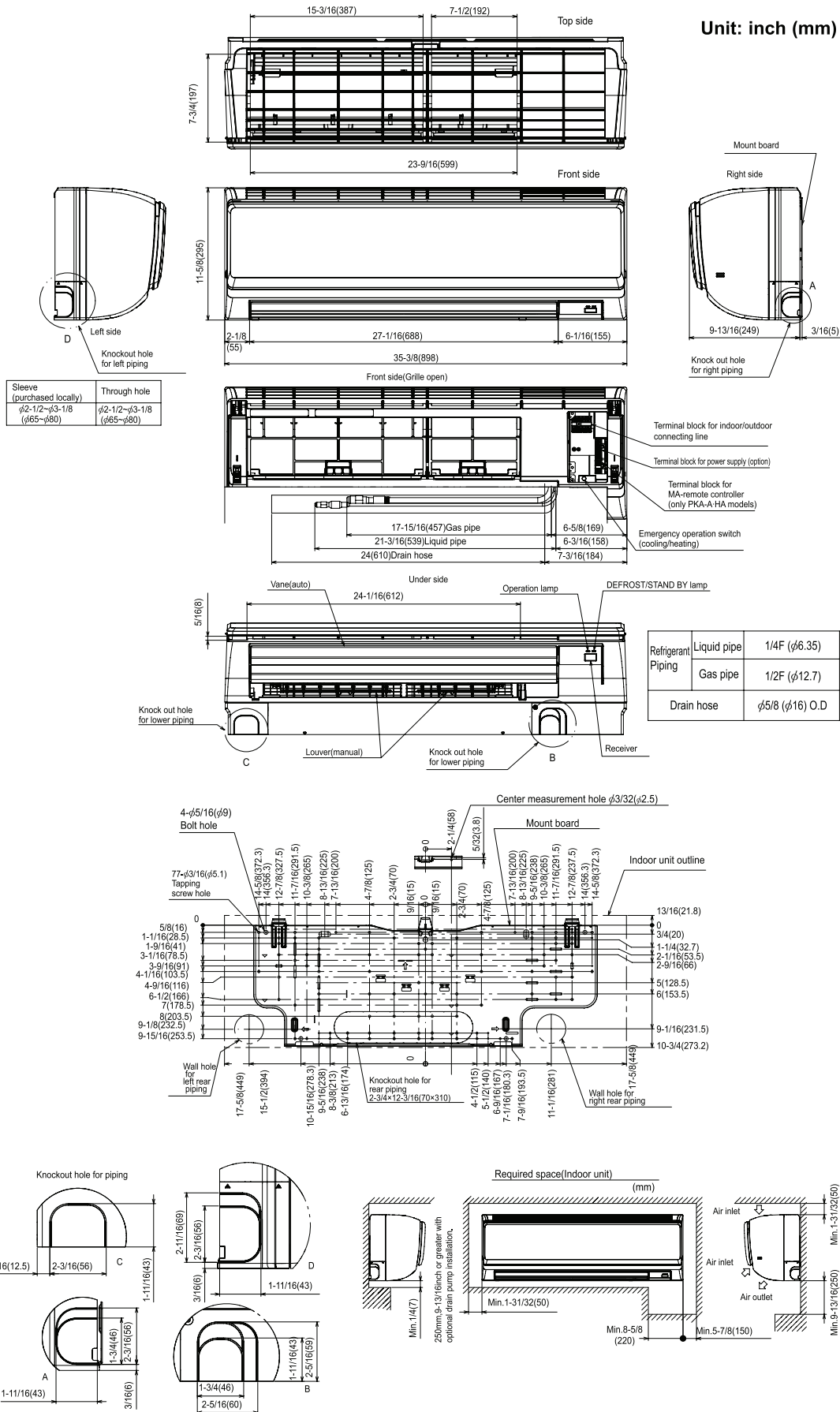
DIMENSIONS	INCHES / MM
W	31-1/2 / 800
D	13 + 7/8 / 330 + 23
H	23-5/8 / 600

Weight ..... 90 lbs. / 41 kg  
External Finish ..... Munsell No. 3Y 7.8 / 1.1  
Refrigerant Type ..... R410A  
Refrigerant Pipe Size O.D.  
Gas Side ..... 1/2" / 12.7 mm  
Liquid Side ..... 1/4" / 6.35 mm  
Max. Refrigerant Pipe Length ..... 100' / 30 m  
Max. Refrigerant Pipe Height Difference ..... 100' / 30 m  
Connection Method ..... Flared


**INVERTER**

# DIMENSIONS: PKA-A12HA

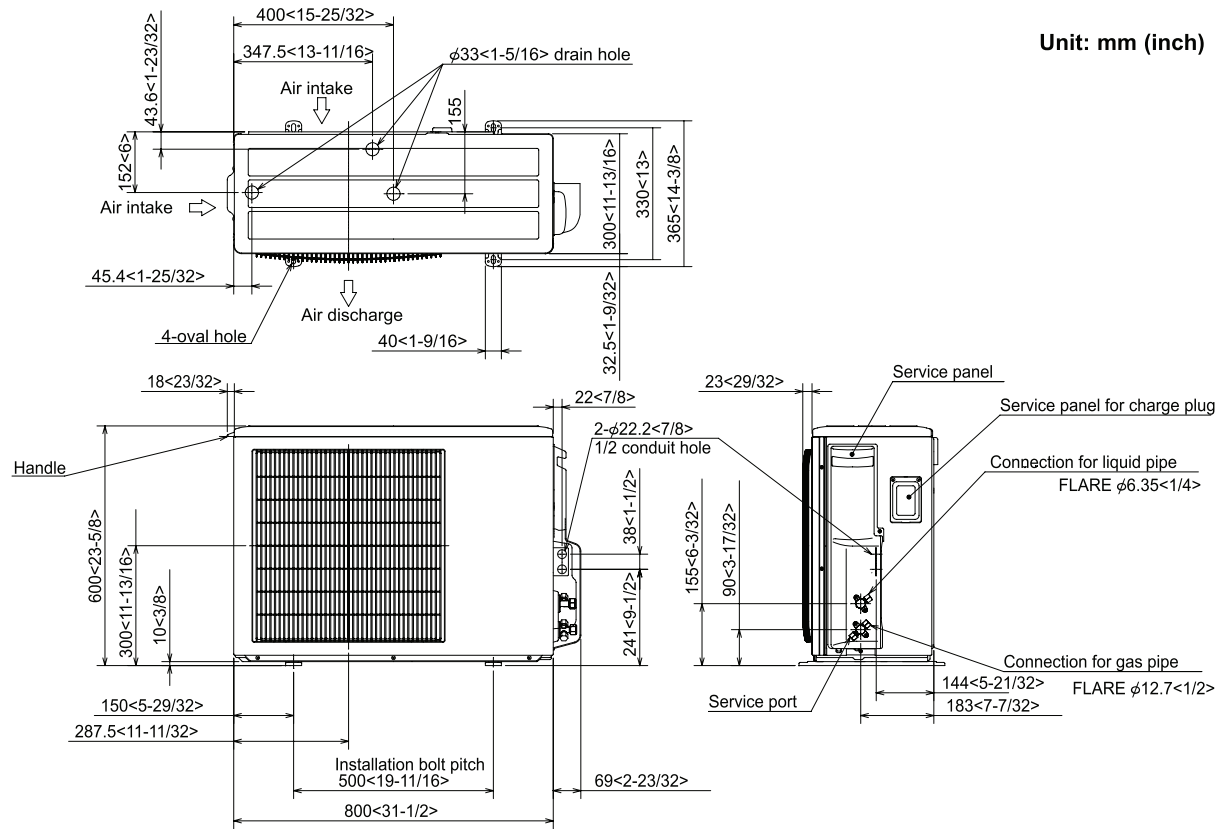
Unit: inch (mm)



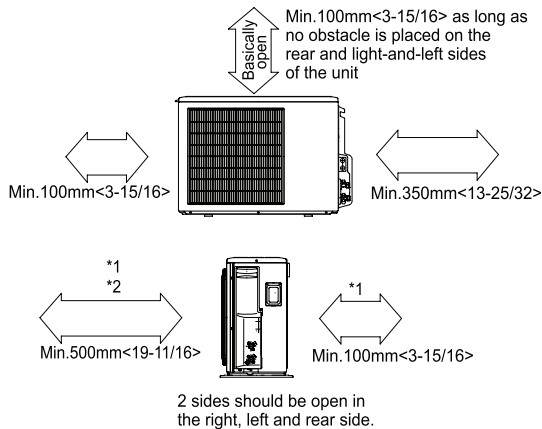


# DIMENSIONS: PUY-A12NHA3

Unit: mm (inch)

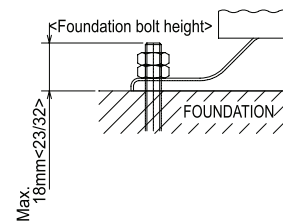


## Clearance space around the outdoor unit



## FOUNDATION BOLTS

Please secure the unit firmly with 4 foundation M10<W3/8> bolts. (Bolts, washers and nut must be purchased locally.)



## PIPING-WIRING DIRECTION

Piping and wiring connection can be made from the rear direction only.

## Minimum installation space for outdoor unit

- \*1 In the place where short cycle tends to occur, cooling and heating capacity and power consumption might get lowered 10%. Air outlet guide (optional) will help them improve.
- \*2 If air discharges to the wall, the surface might get stained.



## HVAC Advanced Products Division

3400 Lawrenceville Suwanee Rd  
Suwanee, GA 30024  
Tele: 678-376-2900 • Fax: 800-889-9904  
Toll Free: 800-433-4822 (#3)  
www.mehvac.com

Specifications are subject to change without notice.



# HVAC Submittal Cover Sheet

## SECTION: 4

### PRODUCT: Ceiling, Kitchen and Make-Up Exhaust Fans

Paulson-Cheek Mechanical, Inc.  
6145 Norhtbelt Parkway, Suite F  
Norcross, GA 30071

PHONE: 770-729-0076

FAX: 770-729-1076

PROJECT: **Saint Michael The Archangel  
Catholic Church**

LOCATION: **Woodstock, GA**

Paulson-Cheek Mechanical, Inc.

ARCHITECT'S/ENGINEER'S STAMP

#### Paulson-Cheek Mechanical, Inc.

DATE RECEIVED:	06/25/14
MANUFACTURER:	Pennbarry
SUPPLIER:	GAA
SUBMITTED DATE:	06/25/14

☒ NO ERRORS DETECTED

☐ CORRECT EXCEPTIONS NOTED

THIS APPROVAL OF SHOP DRAWINGS DOES  
NOT RELIEVE THE SUBCONTRACTOR OR VENDOR  
FROM THE REQUIREMENTS OF THE CONTRACT  
DOCUMENTS.

CHECKED BY:	Carden Clark
DATE CHECKED:	06/25/14

**APPROVED**



**GEORGIA AIR ASSOCIATES**

**SUBMITTAL**

PRODUCT: CEILING EXHAUST FANS &  
KITCHEN EXHAUST / MAKE-UP AIR FANS

PAGE: 1 OF 1

MANUFACTURER: PENNBARRY

FILE: \_\_\_\_\_

SPEC. PARA. NO.: 233416-2.1,2 & 233423-2.1/3

DATE: 6/25/14

PROJECT: ST. MICHAEL THE ARCHANGEL CATHOLIC CHURCH  
LOCATION: WOODSTOCK, GA  
REMARKS: \_\_\_\_\_

ARCH: SIZEMORE GROUP ARCHITECTS  
ENGR: LEPPARD JOHNSON & ASSOC.  
CUST: PAULSON-CHEEK MECHANICAL

<u>TAG:</u>	<u>QTY:</u>	<u>MODEL:</u>	<u>CFM:</u>	<u>S.P.:</u>	<u>HP:</u>	<u>VOLTAGE:</u>	<u>ACCESSORIES:</u>
EF-1,2	2	Z10S	375	.50"	243W	115/1/60	LT
EF-3	1	Z5H	50	.40"	79W	115/1/60	LT
EF-4,5,6,7	4	Z5H	75	.40"	79W	115/1/60	LT
KEF-1	1	FX14B	2708	1.25"	1.5	208/3/60*	FT, DS, FHK, UG18-NWN
MAU-1	1	FS12B	2166	1.0"	1	208/3/60*	DS-ITW1, UG12

ACCESSORIES (EF-1/7):

LT = LEKTROL SPEED CONTROLLER. (EF-1/7)

NOTE: CEILING GRILLE, BACKDRAFT DAMPER AND DISCONNECT SWITCH ARE STANDARD ON EF-1/7.

A/E confirm manufacturer and models for KEF and MAU.

ACCESSORIES (KEF-1):

FT = FATRAP CONSTRUCTION PER NFPA96. UL762 LABEL, GREASE BOX & NEMA 3R ENCLOSURE.

DS = NEMA 1 DISCONNECT SWITCH. (MOUNTED IN NEMA 3R ENCLOSURE).

FHK = FLOATING HINGE KIT.

UG18-NWN = 18" HIGH GALVANIZED STEEL INSULATED ROOF CURB WITHOUT WOOD NAILER PER NFPA96. (23.25" x 23.25" O.D.)

ACCESSORIES (MAU-1):

DS-ITW1 = NEMA 1 DISCONNECT SWITCH, FACTORY-WIRED.

UG12 = 12" HIGH GALVANIZED STEEL INSULATED ROOF CURB. (31" x 31" O.D.)

A/E Confirm

NOTES:

1) \*\* PLEASE ADVISE MOTOR VOLTAGES FOR KEF-1 AND MAU-1.

2) ROOF CURBS FOR KEF-1 & MAU-1 ARE FOR A FLAT, CONVENTIONAL ROOF. (PLEASE VERIFY)

Flat Roof at Kitchen

# General Fan Schedule

Job Name: Saint Michael The Archangel Catholic Church  
 Job Notes:



PENN BARRY

Tag /Mark	EF-1,2	EF-3	EF-4,5,6,7	KEF-1	MAU-1
QTY	2	1	4	1	1
Product Line	Zephyr	Zephyr	Zephyr	Fumex	FHS Muffan
Model	Z10S	Z5H	Z5H	FX14B	FS12B
Drive	VarSpd	VarSpd	VarSpd	Belt	Belt
Flow Rate- (CFM)	375	50	75	2708	2166
SP - ("w.g.)	0.50	0.40	0.40	1.25	1.00
Temperature - (F)	70	70	70	70	70
Altitude - (ft.)	0	0	0	0	0
RPM	1023	1471	1534	1504	957
BHP/Watts	243.00	79.00	79.00	1.09	0.82
Motor	0.29 HP 115/1/60 Open	0.016 HP 115/1/60 Open	0.016 HP 115/1/60 Open	1.5 HP 208/3/60 OPEN	1 HP 208/3/60 OPEN
Tip Speed - (ft/min)	2040	2021	2108	6252	3225
Inlet Vel (ft/min)	250	71	107	2399	461
Outlet Vel (ft/min)	1172	227	341	1642	1484
SE%	0.00	0.00	0.00	49.00	41.67
ME%	0.00	0.00	0.00	55.59	47.38
Sones	5.38	2.56	2.77	18.88	0.00
NC	45	40	40	75	0
dBA	51	41	41	70	0
Mounting Position	Ceiling Right Angle Discharge	Ceiling Right Angle Discharge	Ceiling Right Angle Discharge	Roof	Roof
Application	Exhaust	Exhaust	Exhaust	Exhaust	Supply
Fan Notes					
Ro/Opng - (In)	0.00	0.00	0.00	16.00	24.00
Dmpr.O.D.(In)	0.00	0.00	0.00	15.75	23.50
Shipping W. - (lbs)	30	14	14	115	220
Accessories:					
1	Lek-Trol Electronic Speed Controller	Lek-Trol Electronic Speed Controller	Lek-Trol Electronic Speed Controller	Fatrap	NEMA 1 - Disconnect
2	Thermal Overload Protection	Thermal Overload Protection	Thermal Overload Protection	Floating Hinge Kit	NEMA 1 Internal Wiring
3				Grease Box	UG12 - 12 Inch Flat Curb
4				NEMA 1 - Disconnect	
5				NEMA 3R Internal Wiring	
6				No Wooden Nailor For Curbs	
7				UG18 - 18 Inch Flat Curb	
8				UL 762 Listing	
9				Weather Proof Disconnect Enclosure	
10					
11					
12					
13					
14					
15					
Specials:					
	Project: St. Michael The Archangel Catholic Church				
	Location: Woodstock, GA				
	Mech. Cont: Paulson-Cheek Mechanical				
	Mech. Engineer: Leppard Johnson & Associates				
	Submitted by: Georgia Air Associates				

**VARSPD DRIVE FORWARD CURVED CEILING  
EXHAUST FAN**

PERFORMANCE						
Qty	Model	Volume (CFM)	SP (in. w.c.)	RPM	BHP/Watts	TipSpeed
2	Z10S	375	0.50	1,023	243.00	2,040

MOTOR INFORMATION		
Motor HP	Volt/Ph/Hz	Enclosure
0.29	115/1/60	Open

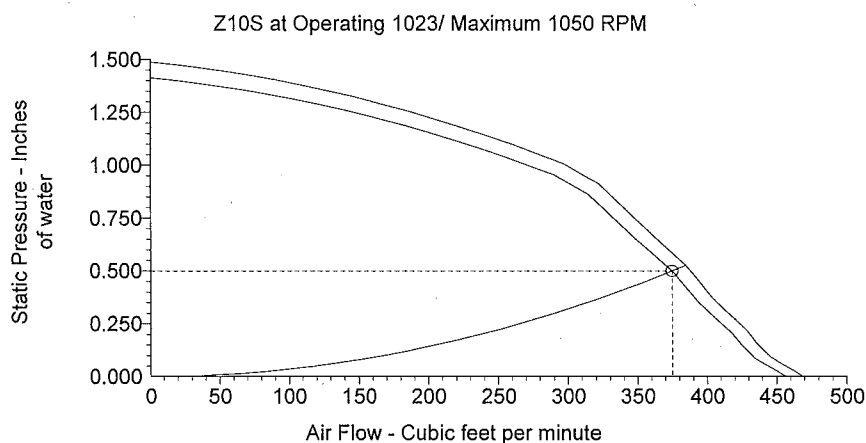
DIMENSIONS		
Damper Size (in.)	Ro\Opng (in.)	Shipping Wgt. (lbs)
0X0	N/A	30



SOUND POWER (dB re 10 <sup>-12</sup> )								NC	Dba	Sones
OCTAVE POWER CENTER FREQUENCY (hz)										
63	125	250	500	1000	2000	4000	8000			
61	66	60	60	57	53	49	42	45	51	5.4

**Accessories:**

- 1) Lek-Trol Electronic Speed Controller
- 2) Thermal Overload Protection



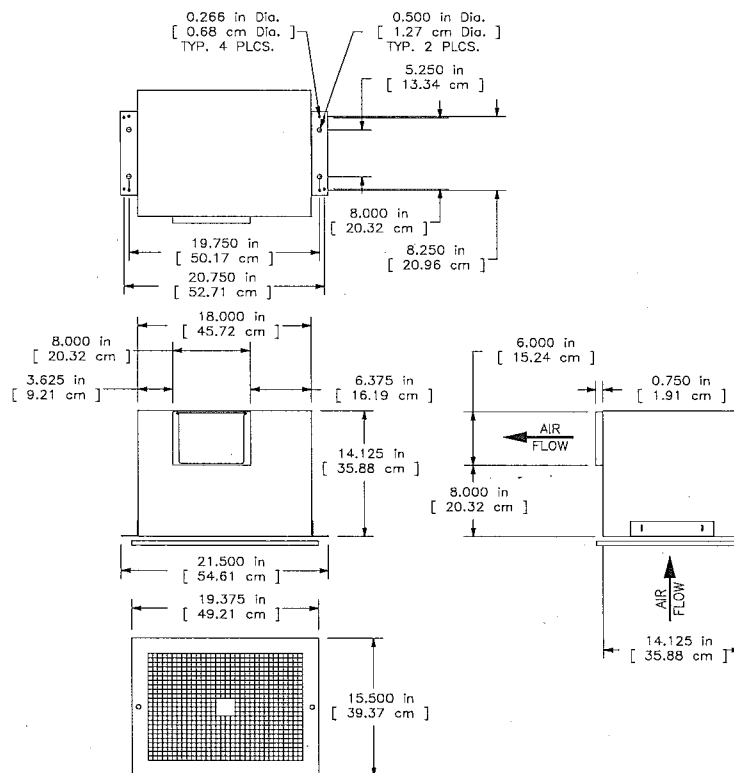
## VARSPD DRIVE FORWARD CURVED CEILING

### EXHAUST FAN

#### STANDARD CONSTRUCTION

Housing acoustically insulated galvanized \* Forward curved centrifugal blower \* Integral chatter proof backdraft damper (except Z14/15) \* Face white egg crate design grille providing 85% Free Area \* Motor continuous duty, with thermal overload protection, positively cooled, & mounted on vibration isolators \* Includes electrical disconnect "plug" (except Z14/15) to pre-wired junction box  
\* Fan/motor/wheel "power pack" is removable \* Corrosion resistant fasteners \*

Note: All Dimensions shown are in units of inches



**VARSPD DRIVE FORWARD CURVED CEILING  
EXHAUST FAN**

PERFORMANCE						
Qty	Model	Volume (CFM)	SP (in. w.c.)	RPM	BHP/Watts	TipSpeed
1	Z5H	50	0.40	1,471	79.00	2,021

MOTOR INFORMATION		
Motor HP	Volt/Ph/Hz	Enclosure
0.016	115/1/60	Open

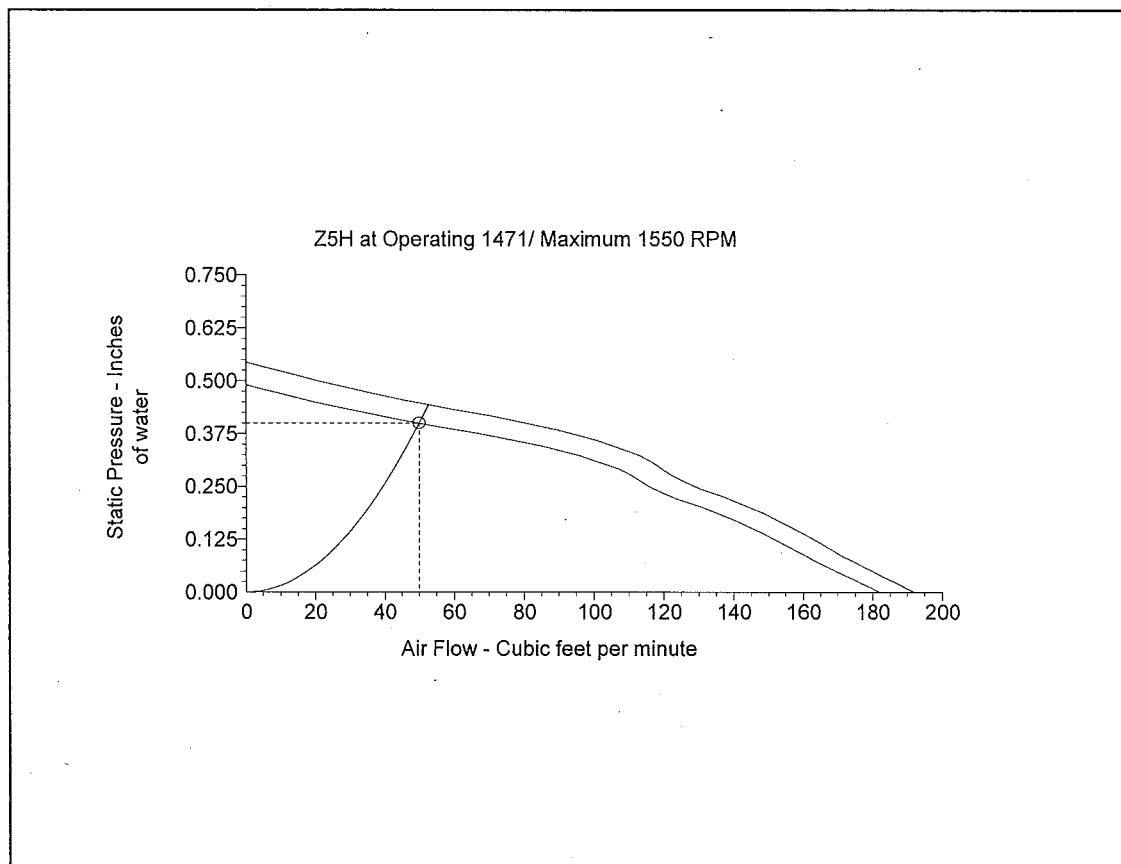
DIMENSIONS		
Damper Size (in.)	Ro/Opng (in.)	Shipping Wgt. (lbs)
0X0	N/A	14



SOUND POWER (dB re 10 <sup>-12</sup> )								NC	Dba	Sones
OCTAVE POWER CENTER FREQUENCY (hz)										
63	125	250	500	1000	2000	4000	8000			
59	56	50	49	49	42	33	27	40	41	2.6

**Accessories:**

- 1) Lek-Trol Electronic Speed Controller
- 2) Thermal Overload Protection



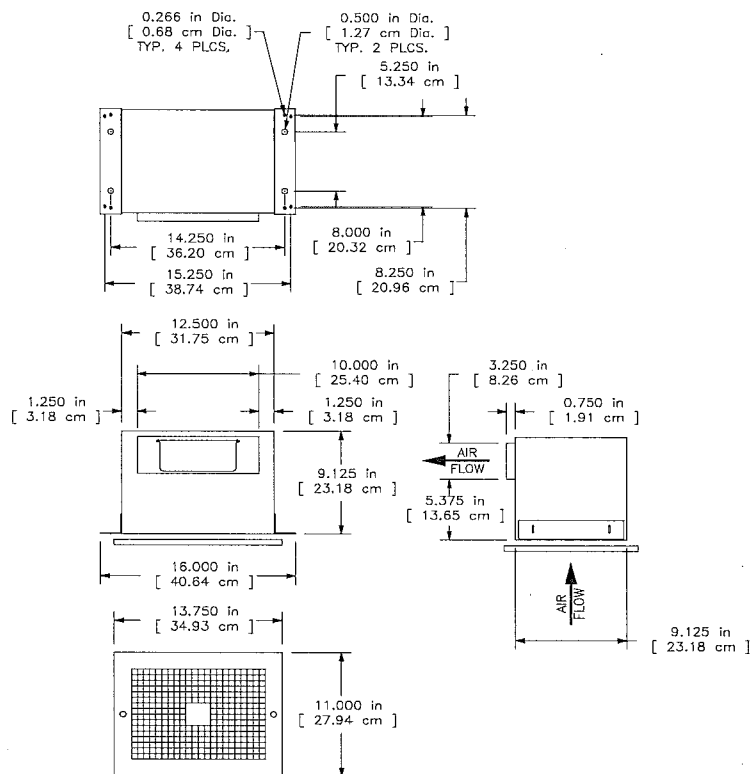
## VARSPD DRIVE FORWARD CURVED CEILING

### EXHAUST FAN

#### STANDARD CONSTRUCTION

Housing acoustically insulated galvanized \* Forward curved centrifugal blower \* Integral chatter proof backdraft damper (except Z14/15) \* Face white egg crate design grille providing 85% Free Area \* Motor continuous duty, with thermal overload protection, positively cooled, & mounted on vibration isolators \* Includes electrical disconnect "plug" (except Z14/15) to pre-wired junction box \* Fan/motor/wheel "power pack" is removable \* Corrosion resistant fasteners \*

Note: All Dimensions shown are in units of inches





**VARSPD DRIVE FORWARD CURVED CEILING  
EXHAUST FAN**

PERFORMANCE						
Qty	Model	Volume (CFM)	SP (in. w.c.)	RPM	BHP/Watts	TipSpeed
4	Z5H	75	0.40	1,534	79.00	2,108

MOTOR INFORMATION		
Motor HP	Volt/Ph/Hz	Enclosure
0.016	115/1/60	Open

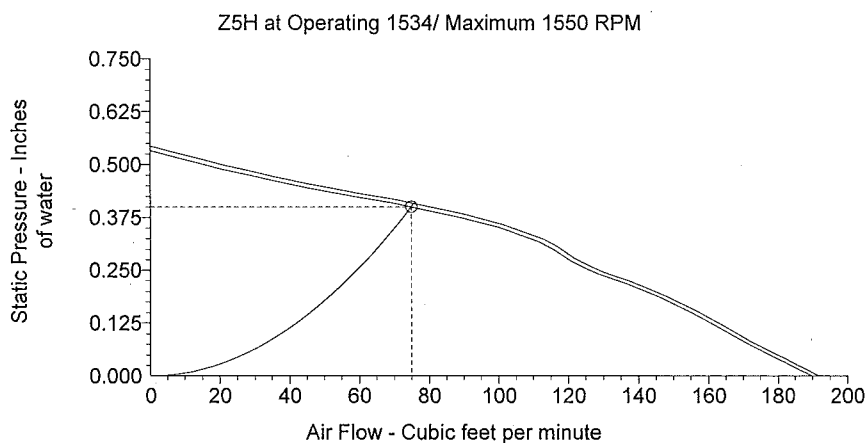
DIMENSIONS		
Damper Size (in.)	Ro\Opng (in.)	Shipping Wgt. (lbs)
0X0	N/A	14



SOUND POWER (dB re 10 <sup>-12</sup> )								NC	Dba	Sones
OCTAVE POWER CENTER FREQUENCY (hz)										
63	125	250	500	1000	2000	4000	8000			
59	58	51	49	50	43	34	29	40	41	2.8

**Accessories:**

- 1) Lek-Trol Electronic Speed Controller
- 2) Thermal Overload Protection



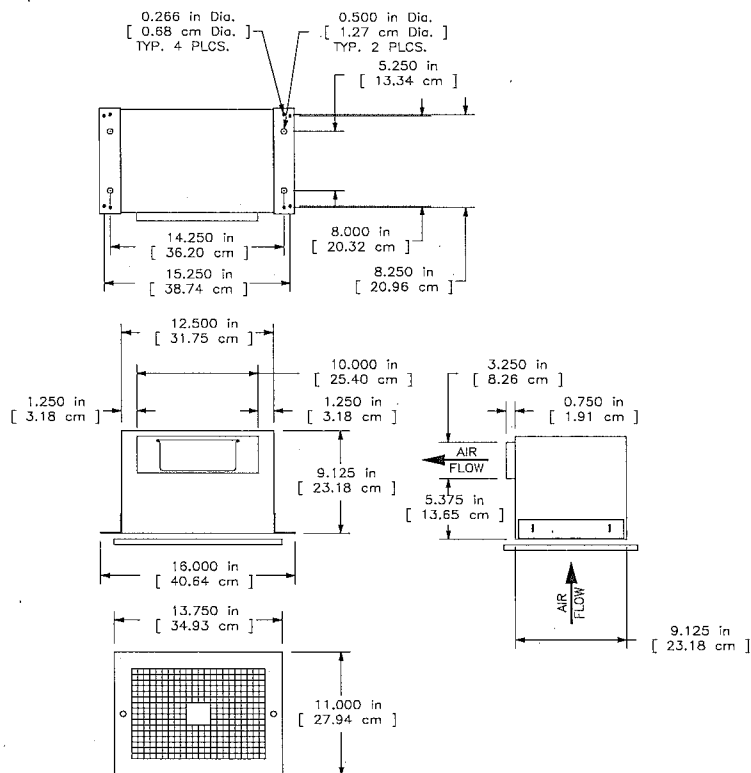
## VARSPO DRIVE FORWARD CURVED CEILING

### EXHAUST FAN

#### STANDARD CONSTRUCTION

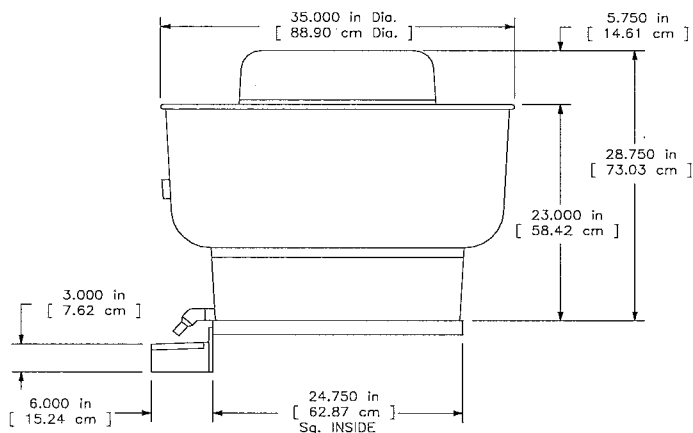
Housing acoustically insulated galvanized \* Forward curved centrifugal blower \* Integral chatter proof backdraft damper (except Z14/15) \* Face white egg crate design grille providing 85% Free Area \* Motor continuous duty, with thermal overload protection, positively cooled, & mounted on vibration isolators \* Includes electrical disconnect "plug" (except Z14/15) to pre-wired junction box \* Fan/motor/wheel "power pack" is removable \* Corrosion resistant fasteners \*

Note: All Dimensions shown are in units of inches



# **BELT DRIVE CENTRIFUGAL ROOF EXHAUST FAN** **STANDARD CONSTRUCTION**

Alum. housing \* Backward inclined centrifugal alum. Wheel (steel for Smoke Removal) \* Alum. (galv. optional) pre-punched base w/ welded corners \* Oversized elec. chase \* Pre-wired jct. box (single speed ODP motors up to 5 HP) \* Large dia. motor dome cooling tube \* Motors continuous duty, ball bearing, mounted out of airstream & positively cooled \* Variable pitch motor pulley \* Static resistant belt(s) \* Regreaseable pillow block ball bearings \* Vibration isolators \* FT (Fatrap) option UL762 400 construction & label, motor pre-wired to weather proof jct box & grease collector/water separator box \* High Wind option NOA 08-1202.13 Designed to handle 155 MPH winds. \* Smoke Removal option - 500 for 4 hours and 1000 for 1 hour



Note: All Dimensions shown are in units of inches

## **PERFORMANCE**

Qty	Model	Volume (CFM)	SP (in. w.c.)	RPM	BHP/Watts	TipSpeed
1	FX14B	2,708	1.25	1,504	1.09	6,252

## **MOTOR INFORMATION**

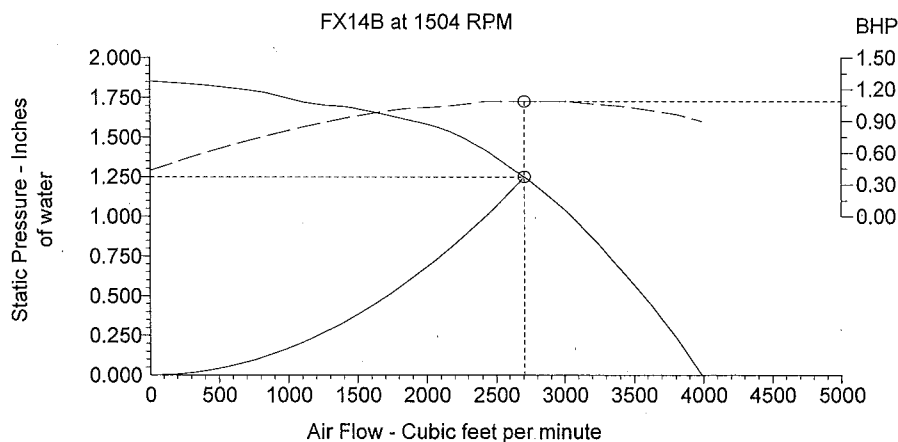
Motor HP	Volt/Ph/Hz	Enclosure
1.5	208/3/60	OPEN

## **DIMENSIONS**

Damper Size (in.)	Ro/Opng (in.)	Shipping Wgt. (lbs)
15.75X15.75	16X16	115

## **SOUND POWER (dB re 10<sup>-12</sup>)**

OCTAVE POWER CENTER FREQUENCY (hz)								LwA	Dba	Sones
63	125	250	500	1000	2000	4000	8000			
78	79	87	78	74	72	68	63	75	70	18.9

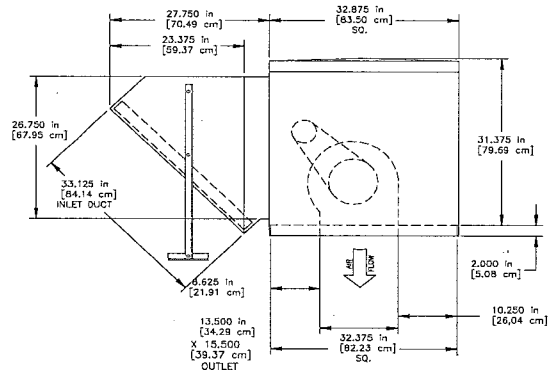
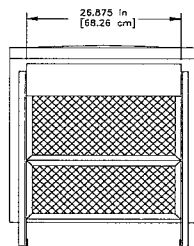


## **Accessories:**

- 1) Fatrap
- 2) Floating Hinge Kit
- 3) Grease Box
- 4) NEMA 1 - Disconnect
- 5) NEMA 3R Internal Wiring
- 6) No Wooden Nailer For Curbs
- 7) UG18 - 18 Inch Flat Curb
- 8) UL 762 Listing
- 9) Weather Proof Disconnect Enclosure

# **BELT DRIVE FORWARD CURVED ROOF SUPPLY FAN STANDARD CONSTRUCTION**

Galvanized housing with single intake (extended length optional) \* Removable, permanent, washable filter(s) installed on intake \* Top panel removable, pitched (for drainage), gasketed, insulated, with quick release latches \* Forward curved centrifugal blower \* Pre-wired junction box (single speed ODP motors up to 5 HP) \* Motors continuous duty, ball bearing design, & positively cooled \* Variable pitch motor pulley \* Static resistant belt(s) \* Permanently lubricated bearings \* Shafts turned, ground, polished, & rust protected \* Corrosion resistant fasteners \*



Note: All Dimensions shown are in units of inches

## **PERFORMANCE**

Qty	Model	Volume (CFM)	SP (in. w.c.)	RPM	BHP/Watts	TipSpeed
1	FS12B	2,166	1.00	957	0.82	3,225

## **MOTOR INFORMATION**

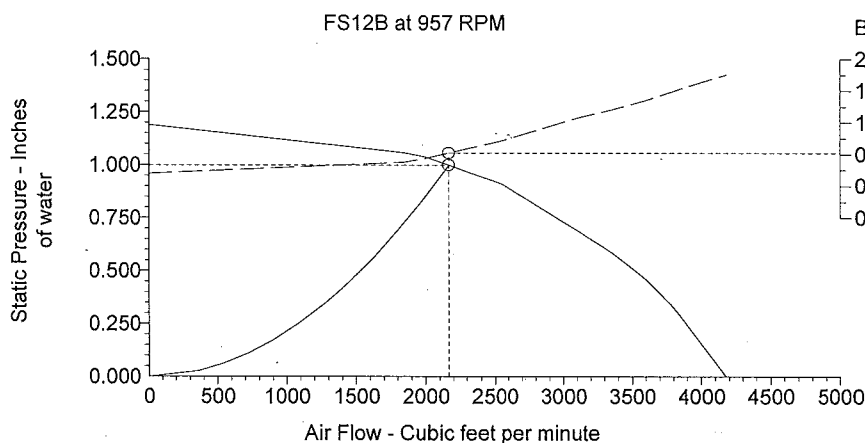
Motor HP	Volt/Ph/Hz	Enclosure
1	208/3/60	OPEN

## **DIMENSIONS**

Damper Size (in.)	Ro/Opng (in.)	Shipping Wgt. (lbs)
23.5X23.5	24X24	220

## **SOUND POWER (dB re 10<sup>-12</sup>)**

OCTAVE POWER CENTER FREQUENCY (hz)								LwA	Dba	Sones
63	125	250	500	1000	2000	4000	8000			
0	0	0	0	0	0	0	0	0	0	0.0



## **Accessories:**

- 1) NEMA 1 - Disconnect
- 2) NEMA 1 Internal Wiring
- 3) UG12 - 12 Inch Flat Curb



PennBarry  
1401 N. Plano Road,  
Richardson, TX 75081

Job Name: Saint Michael The Archangel Catholic Church

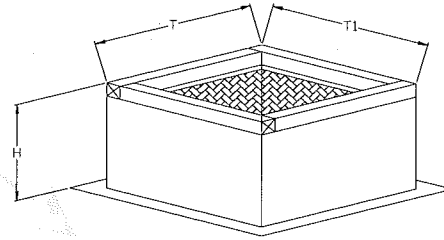
Date: 6/29/2014

## UG FLAT

Galvanized - Unibeam - Straight Wall  
Roof Curb

### Standard Construction Features:

- 18 ga. Galvanized Steel
- all welded construction
- 1.5"/3# density fiberglass insulation
- wood nailer
- fastening flange



STANDARD UG CURB

### Dimensions

Tag / Mark	Fan	Height(in)	QTY	Ro(in.)	Ro'(in.)	T(in.)	T'(in.)	H(in.)	Shipping Wt
KEF-1	FX14B	18.00	1	16.00	16.00	23.25	23.25	18.00	48.00
MAU-1	FS12B	12.00	1	24.00	24.00	30.88	30.88	18.00	63.00

Project: St. Michael The Archangel Catholic  
Church

Location: Woodstock, GA

Mech. Cont: Paulson-Cheek Mechanical

Mech. Engineer: Leppard Johnson & Associates

Submitted by: Georgia Air Associates



**APPROVED**

# HVAC Submittal Cover Sheet

**SECTION: 5**

**PRODUCT: Wall Caps for Exhaust fans**

Paulson-Cheek Mechanical, Inc.  
6145 Norhtbelt Parkway, Suite F  
Norcross, GA 30071

PHONE: 770-729-0076

FAX: 770-729-1076

PROJECT: **Saint Michael The Archangel  
Catholic Church**

LOCATION: **Woodstock, GA**

Paulson-Cheek Mechanical, Inc.

ARCHITECT'S/ENGINEER'S STAMP

## Paulson-Cheek Mechanical, Inc.

DATE RECEIVED: 06/25/14  
MANUFACTURER: Lambro  
SUPPLIER: GAA  
SUBMITTED DATE: 06/25/14

☒ NO ERRORS DETECTED

☐ CORRECT EXCEPTIONS NOTED

THIS APPROVAL OF SHOP DRAWINGS DOES  
NOT RELIEVE THE SUBCONTRACTOR OR VENDOR  
FROM THE REQUIREMENTS OF THE CONTRACT  
DOCUMENTS.

CHECKED BY: Carden Clark  
DATE CHECKED: 06/25/14



# GEORGIA AIR ASSOCIATES

## SUBMITTAL

PRODUCT: WALL CAPS PAGE: 1 OF 1

MANUFACTURER: LAMBRO FILE: \_\_\_\_\_

SPEC. PARA. NO.: MECH. DWGS. DATE: 6/25/14

PROJECT: ST. MICHAEL THE ARCHANGEL CATHOLIC CHURCH ARCH: SIZEMORE GROUP ARCHITECTS

LOCATION: WOODSTOCK, GA ENGR: LEPPARD JOHNSON & ASSOC.

REMARKS: \_\_\_\_\_ CUST: PAULSON-CHEEK MECHANICAL

<u>QTY:</u>	<u>MODEL:</u>	<u>SIZE:</u>	<u>TAG:</u>
2	348	8"	WALL CAPS @ EF-4,5,6,7 CEILING EF'S

Lambro Industries, Inc.

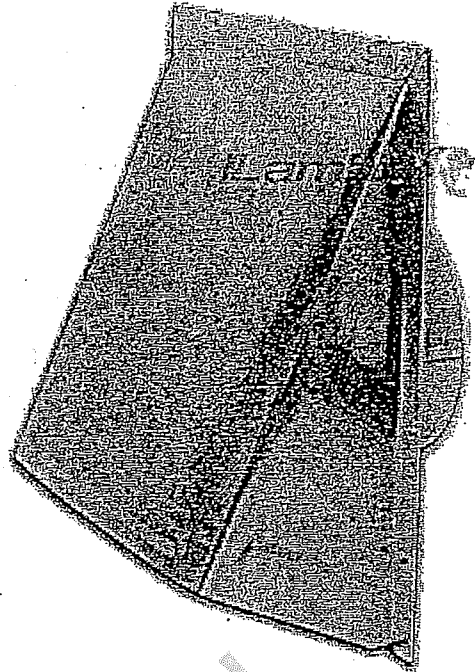
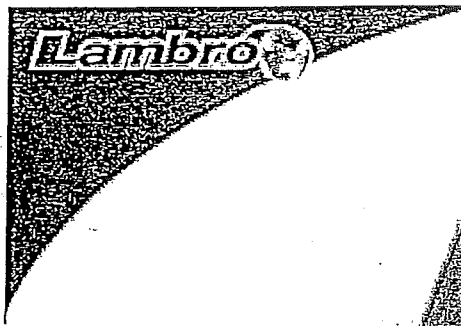
Project: St. Michael The Archangel Catholic  
Church

Location: Woodstock, GA

Mech. Cont: Paulson-Cheek Mechanical

Mech. Engineer: Leppard Johnson & Associates

Submitted by: Georgia Air Associates



~~Wall Caps > Aluminum Round > 346~~

~~Item Code: 346  
Description: 6" Aluminum Wall Cap  
Pack Quantity: 1~~

Wall Caps > Aluminum Round > 348

Item Code: 348  
Description: 8" Aluminum Wall Cap  
Pack Quantity: 1

Dimensions: 10" wide x 11-1/4" high.

~~Wall Caps > Aluminum Round > 110A~~

~~Item Code: 110A  
Description: 4" Aluminum Hood with 3" Tail  
Pine Spring loaded with 3" -  
4" Adaptor Included~~

~~Dimensions: 6" wide x 6" high.~~

All Wall Caps are provided with Spring-loaded Backdraft Damper.





**APPROVED**

# HVAC Submittal Cover Sheet

**SECTION: 6**

**PRODUCT: Motor Operated Dampers**

Paulson-Cheek Mechanical, Inc.  
6145 Norhtbelt Parkway, Suite F  
Norcross, GA 30071

PHONE: 770-729-0076  
FAX: 770-729-1076

PROJECT: **Saint Michael The Archangel  
Catholic Church**  
LOCATION: **Woodstock, GA**

Paulson-Cheek Mechanical, Inc.

ARCHITECT'S/ENGINEER'S STAMP

## Paulson-Cheek Mechanical, Inc.

DATE RECEIVED: 06/25/14  
MANUFACTURER: Nailor Industries  
SUPPLIER: GAA  
SUBMITTED DATE: 06/25/14

☒ NO ERRORS DETECTED

☐ CORRECT EXCEPTIONS NOTED

THIS APPROVAL OF SHOP DRAWINGS DOES  
NOT RELIEVE THE SUBCONTRACTOR OR VENDOR  
FROM THE REQUIREMENTS OF THE CONTRACT  
DOCUMENTS.

CHECKED BY: Carden Clark  
DATE CHECKED: 06/25/14



PRODUCT: MOTORIZED DAMPERS PAGE: 1 OF 1  
MANUFACTURER: NAILOR INDUSTRIES FILE: \_\_\_\_\_  
SPEC. PARA. NO.: 233330-2.5 DATE: 6/25/14

PROJECT: ST. MICHAEL THE ARCHANGEL CATHOLIC CHURCH	ARCH: SIZEMORE GROUP ARCHITECTS
LOCATION: WOODSTOCK, GA	ENGR: LEPPARD JOHNSON & ASSOC.
REMARKS:	CUST: PAULSON-CHEEK MECHANICAL

4

# CONTROL DAMPER

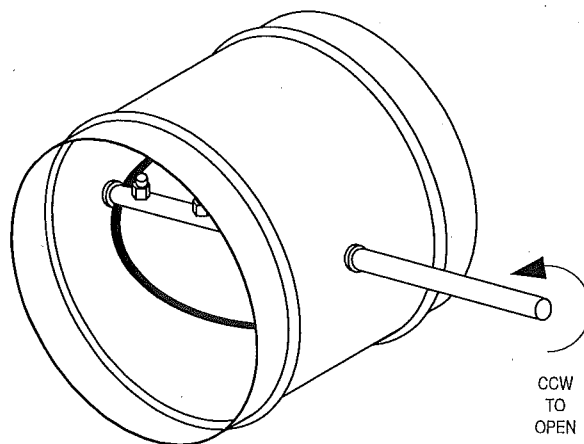
## ROUND • STEEL

## LOW LEAKAGE

## MODEL: 1090

Model 1090 is an ultra-low leakage steel butterfly control damper which has been designed for all types of round ductwork applications. Suitable for use in low to medium pressure and velocity commercial HVAC systems, the 1090 installs quickly and easily, saving money on installation costs.

Design features a sturdy beaded casing for superior rigidity, a 14 ga. (2.0) equivalent laminated blade double bolted to the drive shaft for maximum strength, long life corrosion resistant synthetic bearings and blade seals for low leakage requirements. The damper can be used for two position or modulating control using electric or pneumatic actuators and can also be used as a manual balancing damper or when positive shut-off is required by utilizing an optional hand locking quadrant. A variety of options are available to meet specific installation requirements and a comprehensive selection of electric or pneumatic actuators are available for factory or field mounting.



### STANDARD CONSTRUCTION:

- Frame:** 20 ga. (1.0) corrosion-resistant steel with stiffening beads.
- Blade:** 2 x 20 ga. (1.0) corrosion-resistant steel laminated together, equivalent to 14 ga. (2.0). Open and close end stops. 90 degree rotation. CCW to open.
- Bearings:** 1/2" (13) dia. Celcon®.
- Drive Shaft/Axle:** 1/2" (13) dia. plated steel double bolted to blade. Axle extends approx. 6" (152) beyond frame.
- Blade Seal:** Cross-linked polyethylene.

### Sizes (Duct W x H):

Minimum	Maximum
Single Section	Single Section
4" (102) dia.	24" (610) dia.

Temperature Range: -50°F to 180°F (-46°C to 82°C)

### OPTIONS:

- ☐ ~~BO~~ Oillite bearings
- ☐ ~~BS~~ Stainless steel bearings
- ☐ ~~HLQ~~ Hand locking quadrant
- ☐ ~~HLQ2~~ Hand locking quadrant with 2" (51) stand-off bracket
- ☐ ~~304~~ Type 304 Stainless steel construction
- ☐ ~~Special features~~ \_\_\_\_\_

### ACTUATORS:

Nailor offers a comprehensive selection of electric and pneumatic actuators for factory or field installation.

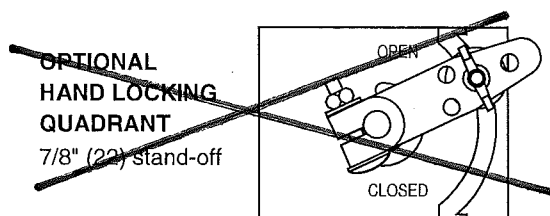
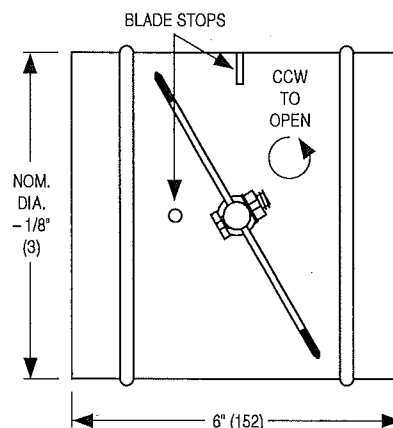
Project: St. Michael The Archangel Catholic  
Church

Location: Woodstock, GA

Mech. Cont: Paulson-Cheek Mechanical

Mech. Engineer: Leppard Johnson & Associates

Submitted by: Georgia Air Associates



Page 1 of 2  
Dimensions are in inches (mm).

DATE	B SERIES	SUPERSEDES	DRAWING NO.
4 - 28 - 14	1000	9 - 2 - 09	1000-6

S



# **CONTROL DAMPER** **ROUND • STEEL • LOW LEAKAGE** **PERFORMANCE DATA** **MODEL: 1090**

## **MAXIMUM SYSTEM PRESSURE**

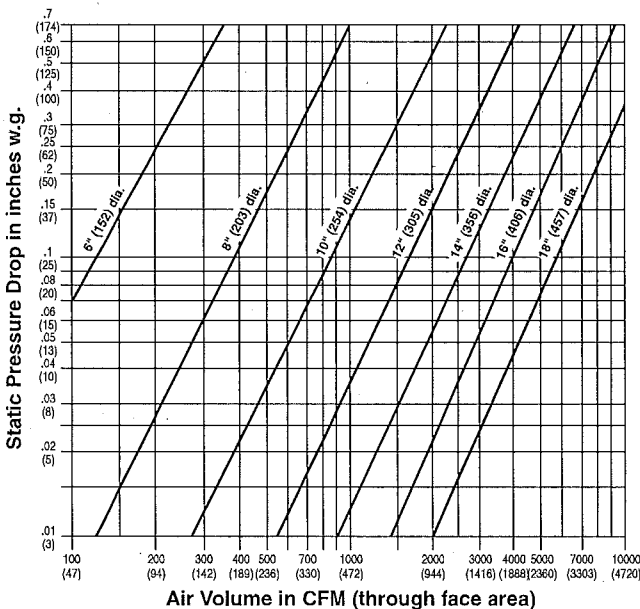
Maximum Damper Diameter	Maximum System Pressure
24" (610)	6" w.g. (1.5 kPa)
18" (457)	6" w.g. (1.5 kPa)
12" (305)	8" w.g. (2 kPa)
6" (152)	10" w.g. (2.5 kPa)

Note: Maximum Face Velocity = 4000 fpm (20 m/s).

## **LEAKAGE: CLASS I**

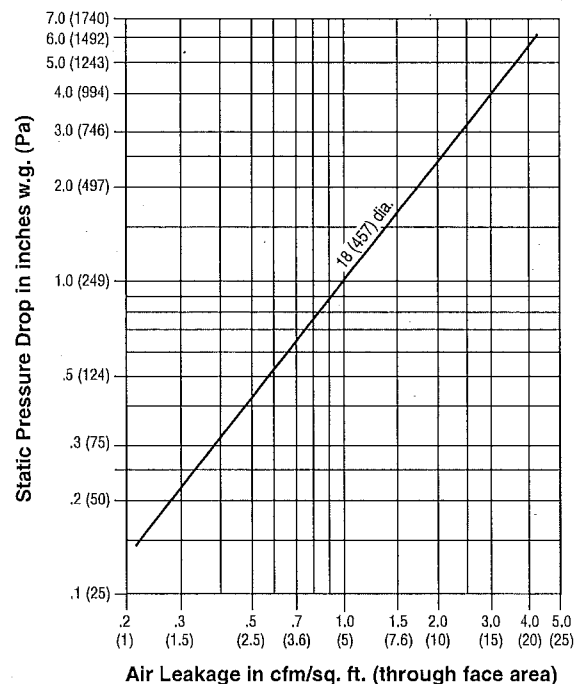
Less than 4 cfm/sq. ft. @ 1" w.g. (0.02 m<sup>3</sup>/s/m<sup>2</sup> @ 250 kPa).  
 Less than 8 cfm/sq. ft. @ 4" w.g. (0.04 m<sup>3</sup>/s/m<sup>2</sup> @ 1 kPa).

## **PRESSURE DROP (damper fully open)**



Tested per AMCA standard 500-D, Fig. 5.3.

## **AIR LEAKAGE (damper fully closed):**



Tested per AMCA standard 500-D, Fig. 5.5.

Project: St. Michael The Archangel Catholic Church  
 Location: Woodstock, GA  
 Mech. Cont: Paulson-Cheek Mechanical  
 Mech. Engineer: Leppard Johnson & Associates  
 Submitted by: Georgia Air Associates

Page 2 of 2  
 Dimensions are in inches (mm).

DATE	B SERIES	SUPERSEDES	DRAWING NO.
4 - 28 - 14	1000	9 - 2 - 09	1000-6



# **LOW LEAKAGE CONTROL DAMPER** **STEEL • STANDARD PERFORMANCE** **MODELS: ~~1010~~ & 1020**

The 1010/20 Series are Nailor's most widely used low leakage dampers and are the standard choice for use in the majority of low to medium velocity and pressure commercial HVAC systems. They are low cost, high quality dampers that meet or exceed the majority of standard specification requirements. They meet the frequently specified leakage criteria of less than 10 cfm per sq. ft at 4" w.g. (0.5% at 2000 fpm). The design features include a sturdy hat channel frame with die-formed corner gussets for reinforcement and structural strength equivalent to 13 gauge channel type frames, a vee groove blade design that maximizes strength and zero maintenance concealed linkage (out of the air stream) for reduced pressure drop and air turbulence.

## **STANDARD CONSTRUCTION:**

- Frame:** 5" x 7/8" x 16 ga. (127 x 22 x 1.6) galvanized steel hat channel with die-formed corner gussets. Low profile (flat top and bottom) on dampers 10" (254) high and under.
- Blades:** 6" (152) wide on 5 1/2" (140) centers. 16 ga. (1.6) galv. steel vee groove design. Parallel or opposed action.
- Linkage:** Concealed type totally enclosed within the frame and out of the airstream. Plated steel.
- Bearings:** 1/2" (13) dia. Celcon®.
- Axles:** 1/2" (13) dia. plated steel double bolted to blades.
- Drive Shaft:** 6" (152) long x 1/2" (13) dia. rigid drive shaft on all single section dampers. A 1/2" (13) or 1" (25) dia. factory installed jackshaft is standard on all multiple section dampers. See multi-section detail 1000 MSI.
- Blade Seals:** Dual durometer bulb type extruded PVC.
- Jamb Seals:** Compression type cambered metal.
- Temperature Range:** -50°F to +180°F (-46°C to +82°C).

## **Sizes (Duct W x H):**

Minimum		Maximum	
Single Section		Single Section	Multiple Section
Single Blade 6" x 4" (152 x 102)	Two Blades (parallel or opposed) 8" x 10" (203 x 254)	48" x 72" (1219 x 1829)	Unlimited

## **OPTIONS:**

- ☐ BO Oilite bearings
- ☐ 304 Stainless Steel construction
- ☒ AMP Actuator mounting side plate
- ☐ DLO Lock-on drive shaft
- ☐ Other \_\_\_\_\_

Nailor offers a wide selection of pneumatic and electric actuators for factory or field installation.

## **Performance Data - Air Leakage (Damper Closed)**

Damper Width	Maximum System Pressure	Maximum System Velocity	Leakage*	
			% of Max. Flow	Cfm/ Sq. Ft.
48" (1219)	2.5" w.g.	2000 fpm	.18	3.5
36" (914)	3.0" w.g.	2000 fpm	.20	4.0
24" (610)	4.0" w.g.	2000 fpm	.23	4.5
12" (305)	5.0" w.g.	2000 fpm	.33	6.6

\* Leakage information is based upon a pressure differential of 1" w.g. tested per AMCA Standard 500-D, Fig. 5.5.

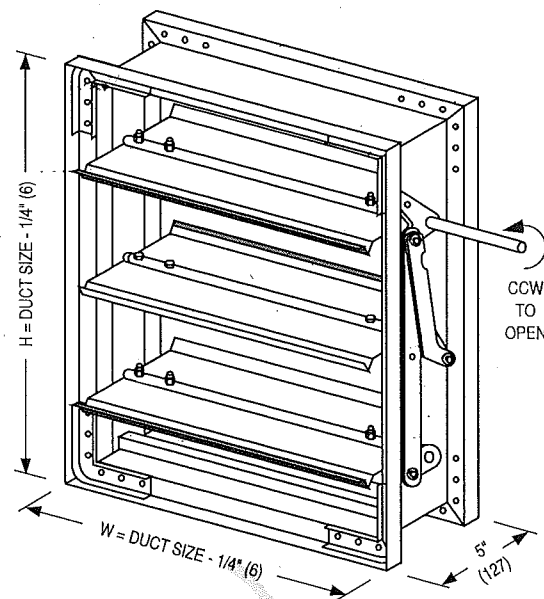
**Project:** St. Michael The Archangel Catholic Church

**Location:** Woodstock, GA

**Mech. Cont:** Paulson-Cheek Mechanical

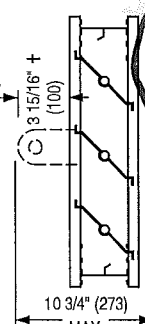
**Mech. Engineer:** Leppard Johnson & Associates

**Submitted by:** Georgia Air Associates

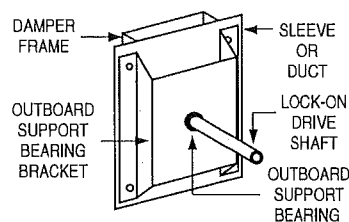
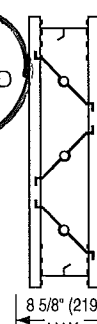


## **MODEL 1010 PARALLEL BLADE**

† jackshaft standard on multiple section dampers. Jackshaft securely bolted to frame.



## **MODEL 1020 OPPOSED BLADE**



Optional lock-on drive shaft support bracket detail.

The low profile frame illustrated is used to maximize free area available on units 10" (254) high and under.

## **Pressure Drop (in. w.g.)**

Damper Size	Approach Velocity (fpm)			
	750	1000	1500	2000
24" x 24" (610 x 610)	.016	.030	.07	.14
36" x 36" (914 x 914)	.013	.023	.05	.09
48" x 48" (1219 x 1219)	.010	.020	.03	.07

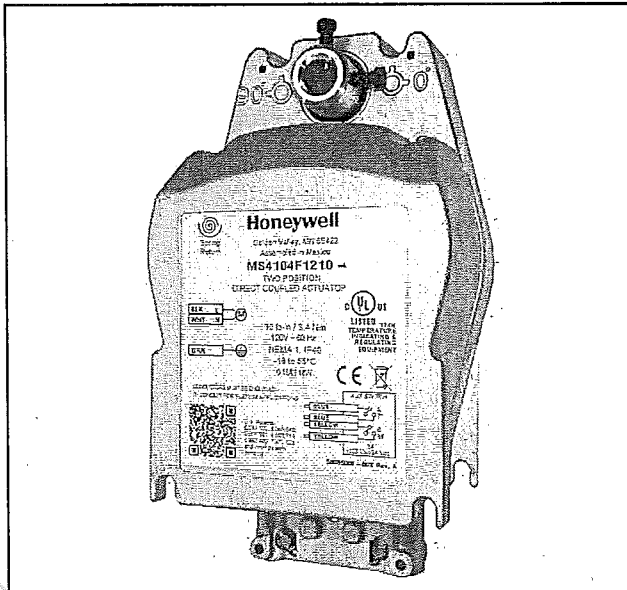
Tested per AMCA Standard 500-D, Fig. 5.3.

Dimensions are in inches (mm).

DATE	A SERIES	SUPERSEDES	DRAWING NO.
12 - 4 - 12	1000	6 - 30 - 04	1000-1

## MS4104, ~~MS4109~~, MS4604, MS4609, MS8104, ~~MS8109~~ Fast-Acting, Two-Position Actuators

### PRODUCT DATA



### FEATURES

- 30 lb-in. (3.4 N•m) or 80 lb-in. (5.9 N•m) minimum driving torque at 350°F (176°C).
- Reversible mounting facilitates use in either clockwise (cw) or counterclockwise (ccw) spring rotation.
- Integral spring return ensures level of return torque.
- Fifteen-second spring return timing.
- No special cycling required during long-term holding. (See Operation section.)
- No audible noise during holding.
- Patent pending design eliminates need for limit switches to reduce power consumption.
- Models available for 24, 120, and 230 Vac.
- Ninety-five degree angle of rotation.
- Actuator holds rated torque at reduced power level.
- Die-cast aluminum housing.
- Housing design allows flush mounting to damper.
- Designed to operate reliably in smoke control systems requiring Underwriter's Laboratories Inc. UL555S ratings up to 350°F.
- Models available with SPST position-indicating switches (7°, 85° stroke).

### APPLICATION

The MS4104, MS4109, MS4604, MS4609, MS8104 and MS8109 Fast-Acting, Two-Position Actuators are spring return direct coupled actuators (DCA) for Fire and Smoke dampers (on/off control). The actuator accepts an on/off signal from a single-pole, single-throw (SPST) controller. Reversible mounting allows actuator to be used for either clockwise (cw) or counterclockwise (ccw) spring rotation.

### Contents

Application .....	1
Features .....	1
Specifications .....	2
Ordering Information .....	2
Installation .....	4
Operation .....	6
Checkout .....	6

Project: St. Michael The Archangel Catholic  
Church

Location: Woodstock, GA

Mech. Cont: Paulson-Cheek Mechanical

Mech. Engineer: Leppard Johnson & Associates

Submitted by: Georgia Air Associates



63-2740-01

## SPECIFICATIONS

Models: See Table 1.

Table 1. Models.

Model	Voltage (Vac)	Internal Auxiliary Switches
MS4104F1010	120	None
MS4104F1210	120	2 SPST <sup>a</sup>
MS4109F1010	120	None
MS4109F1210	120	2 SPST <sup>a</sup>
MS4604F1010	230	None
MS4604F1210	230	2 SPST <sup>a</sup>
MS4609F1010	230	None
MS4609F1210	230	2 SPST <sup>a</sup>
MS8104F1010	24	None
MS8104F1210	24	2 SPST <sup>a</sup>
MS8109F1010	24	None
MS8109F1210	24	2 SPST <sup>a</sup>

<sup>a</sup> Internal switches are designed to pass UL555S requirements (at 350°F).

Dimensions: See Fig. 1.

Minimum Damper Shaft Length: 2 in. (51 mm).

Device Weight: 5 lb (2.3 kg).

Stroke: 95° ± 3°, mechanically limited.

Electrical Ratings: See Table 2.

Electrical Connections:

Power Lead Wires:

MS410xF and MS460xF: 32 inches (0.8m), 18 AWG

MS810xF: 39 inches (1m), 18 AWG

Switch Lead Wires: 18 inches, 18 AWG, 2 color coded leads

Mounting: Round 1/2 inch shaft adapter with 1/4 inch set screws.

### IMPORTANT

Honeywell does not recommend using linkages with these actuators because side-loading of the output hub reduces actuator life.

### Temperature Ratings:

Ambient: 0°F to 130°F (-18°C to 55°C).

Shipping and Storage: -40°F to 140°F (-40°C to 60°C).

### IMPORTANT

The actuator is designed to meet UL555S standards at 350°F (176°C). The actuator must be tested with the damper to achieve this rating.

Humidity Ratings: 5% to 95% RH noncondensing.

### Noise Rating (Maximum):

Driving Open: 80 dBA at 1m.

Holding: 20 dBA at 1m (no audible noise).

### Controller Type:

MS4104, MS4109: Line voltage (120 Vac), two-position, SPST (Series 40).

MS4604, MS4609: Line voltage (230 Vac), two-position, SPST (Series 40).

MS8104, MS8109: Low voltage (24 Vac), two-position, SPST (Series 80).

Table 2. MS4104, MS4109, MS4604, MS4609, MS8104 and MS8109 DCA Models.

Model	Power Consumption		Torque in lb-in. (N•m)	Voltage Input in Vac
	Running	Holding		
MS4104F	0.18A, 18W	0.11A, 9W	30 (3.4)	120 ±10%, 50/60 Hz
MS4109F	0.25A, 23W	0.13A, 7W	80 (9)	
MS4604F	0.13A, 18W	0.10A, 11W	30 (3.4)	230 ±10%, 50/60 Hz
MS4609F	0.13A, 23W	0.09A, 7W	80 (9)	
MS8104F	16 VA	8 VA	30 (3.4)	24Vac/dc +20%, -10%, 50/60 Hz
MS8109F	23 VA	7 VA	80 (9)	

### Torque Rating (at rated voltage):

Spring Return:

MS4104F, MS4604F, MS8104F: 30 lb-in. (3.4 N•m).

MS4109F, MS4609F, MS8109: 80 lb-in. (9 N•m).

Stall Maximum:

MS4104F, MS4604F, MS8104F: 150 lb-in. (17 N•m).

MS4109F, MS4609F, MS8109: 240 lb-in. (27 N•m).

350°F Driving:

MS4104F, MS4604F, MS8104F: 30 lb-in. (3.4 N•m).

MS4109F, MS4609F, MS8109: 80 lb-in. (9 N•m).

## ORDERING INFORMATION

When purchasing replacement and modernization products from your TRADELINE® wholesaler or distributor, refer to the TRADELINE® Catalog or price sheets for complete ordering number. If you have additional questions, need further information, or would like to comment on our products or services, please write or phone:

1. Your local Honeywell Environmental and Combustion Controls Sales Office (check white pages of your phone directory).
2. Honeywell Customer Care  
1885 Douglas Drive North  
Minneapolis, Minnesota 55422-4386
3. <http://customer.honeywell.com> or <http://customer.honeywell.ca>

International Sales and Service Offices in all principal cities of the world. Manufacturing in Belgium, Canada, China, Czech Republic, Germany, Hungary, Italy, Mexico, Netherlands, United Kingdom, and United States.

**Timing (At Rated Torque and Voltage):**

Drive Open: 15 seconds typical.

Spring Close: 15 seconds typical.

**Cycling Requirements:**

Prolonged holding-period (1 year) testing of these actuators has been performed with no spring return failures. The actuator and the internal spring are designed to require no special cycling during long-term holding.

Honeywell recommends following all local, state and national codes for periodic testing of the entire smoke control system. Refer to National Fire Protection Association (NFPA) National Fire Codes®: NFPA90A, NFPA92A and NFPA92B for your application.

NFPA recommends periodic examination of each fire/smoke damper (semi-annually or annually) to ensure proper performance.

**Design Life (at Rated Voltage):** 30,000 full stroke cycles.

**Approvals:** See Table 3.

**Environmental Protection Ratings:** See Table 4.

**Accessories:**

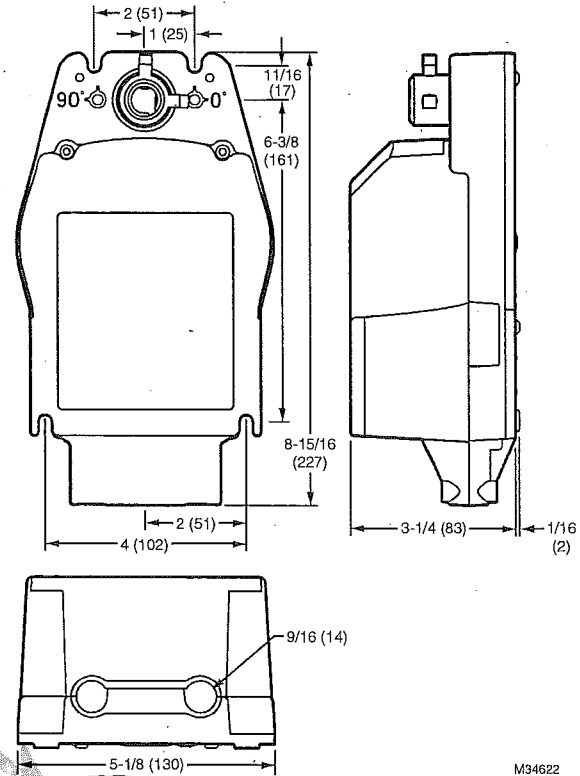
205649 Mounting Bracket (not supplied with actuator).

**Table 3. Approvals.**

	<b>MS4104F, MS4109F, MS4604F, MS4609F</b>	<b>MS8104F, MS8109F</b>
UL/cUL	X	X
UL873	X	X
CE	X	X
C-Tick	X	X

**Table 4. Environmental Ratings.**

All Devices	<b>MS4104, MS4109, MS4604, MS4609, MS8104 and MS8109</b>
NEMA1	IP40



**Fig. 1. MS4104, MS4109, MS4604, MS4609, MS8104 and MS8109 dimensional drawing in in. (mm).**

**Project: St. Michael The Archangel Catholic Church**

**Location: Woodstock, GA**

**Mech. Cont: Paulson-Cheek Mechanical**

**Mech. Engineer: Leppard Johnson & Associates**

**Submitted by: Georgia Air Associates**



## Installation



### CAUTION

**Device Malfunction Hazard.**  
Improper set screw tightening causes device malfunction.

Tighten set screws with proper torque to prevent damper shaft slippage.



### CAUTION

**Actuator Damage Hazard.**  
Using actuator as shaft bearing causes device damage.

Use actuator only to supply rotational torque. Avoid any side loads to actuator output coupling bearings.

To install actuator, proceed as follows:

1. Place actuator over damper shaft; and hold mounting bracket in place. See Fig. 2.
2. Mark screw holes on damper housing.
3. Remove actuator and mounting bracket.
4. Drill or center-punch holes for mounting screws (or use no.10 self-tapping sheet metal screws).
5. Turn damper blades to desired normal (closed) position.
6. Place actuator and mounting bracket back into position and secure bracket to damper box with sheet metal screws.
7. Tighten set screws securely into damper shaft using minimum 100 lb-in., maximum 130 lb-in. torque. Use 1/4 in. wrench (see Specifications for details) to tighten set screws.

## Wiring

See Fig. 3 through 5 for typical wiring diagrams.



### WARNING

**Electrical Power Hazard.**  
Line voltage can cause death or serious injury and short equipment circuitry.  
Disconnect power supply before installation.



### CAUTION

**Electrical Shock or Equipment Damage Hazard.**  
Low voltage can shock individuals or short equipment circuitry.  
Disconnect power supply before installation.

### IMPORTANT

1. All wiring must comply with local electrical codes, ordinances and regulations.
2. Voltage and frequency of transformer must correspond with the characteristics of power supply and actuator.
3. Use wires rated for at least 75°C (167°F).
4. The conduit fittings are designed for use with 3/8 in. reduced-wall steel or aluminum flexible conduit.

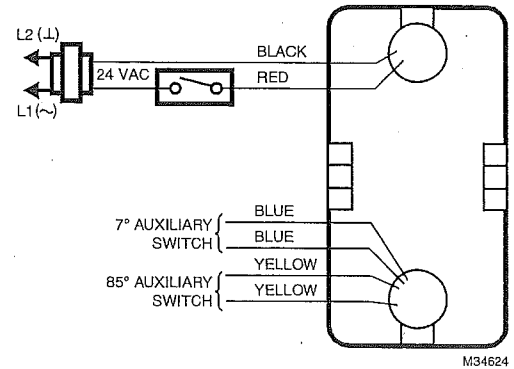


Fig. 3. Typical 24 Vac wiring.

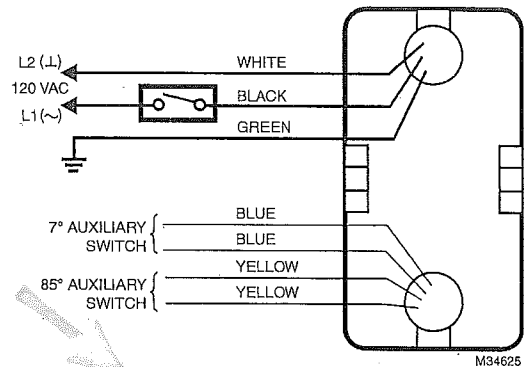


Fig. 4. Typical 120 Vac wiring.

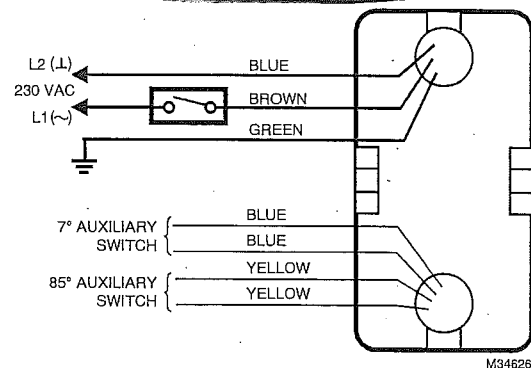


Fig. 5. Typical 230 Vac wiring.

Project: St. Michael The Archangel Catholic  
Church

Location: Woodstock, GA

Mech. Cont: Paulson-Cheek Mechanical

Mech. Engineer: Leppard Johnson & Associates

Submitted by: Georgia Air Associates

**APPROVED**



# HVAC Submittal Cover Sheet

**SECTION: 7**

**PRODUCT: Manual Volume Dampers**

Paulson-Cheek Mechanical, Inc.  
6145 Norhtbelt Parkway, Suite F  
Norcross, GA 30071

PHONE: 770-729-0076

FAX: 770-729-1076

PROJECT: **Saint Michael The Archangel  
Catholic Church**

LOCATION: **Woodstock, GA**

Paulson-Cheek Mechanical, Inc.

ARCHITECT'S/ENGINEER'S STAMP

**Paulson-Cheek Mechanical, Inc.**

DATE RECEIVED: 06/25/14  
MANUFACTURER: Nailor Industries  
SUPPLIER: GAA  
SUBMITTED DATE: 06/25/14

☒ NO ERRORS DETECTED

☐ CORRECT EXCEPTIONS NOTED

THIS APPROVAL OF SHOP DRAWINGS DOES  
NOT RELIEVE THE SUBCONTRACTOR OR VENDOR  
FROM THE REQUIREMENTS OF THE CONTRACT  
DOCUMENTS.

CHECKED BY: Carden Clark  
DATE CHECKED: 06/25/14



A/E Verify

SPEC. PARA. NO.: 233330-2.4 DATE: 6/25/14

REMARKS: CUST: PAULSON-CHEEK MECHANICAL

2



# MANUAL BALANCING DAMPER MODELS: ~~1010~~ PARALLEL BLADE 1820 OPPOSED BLADE

The Nailor 1800 Series Dampers are especially designed for manual balancing applications. They are suitable for use in the majority of commercial low to medium pressure and velocity HVAC systems.

They are designed and built to provide a cost effective and reliable damper for reduced volume control and not positive shut-off. They are not recommended for applications as an automatic control damper.

The 1800 Series includes many of the design features incorporated in the Nailor 1000 Series Control Dampers. These include a sturdy hat channel frame with die-formed corner gussets for reinforcement, a roll-formed vee groove blade design that maximizes strength and zero maintenance concealed linkage (out of the air stream) for reduced air turbulence.

Nailor's 1800 Series exceed the volume damper design recommendations in SMACNA "HVAC Duct Construction Standards - Metal and Flexible" and offer an economical manufactured product alternative to custom 'shop built' dampers.

## STANDARD CONSTRUCTION:

- Frame:** 5" x 7/8" x 16 ga. (127 x 22 x 1.6) galvanized steel hat channel with die-formed corner gussets. Low profile (flat top and bottom) on dampers 10" (254) high and under.
- Blades:** 6" (152) wide on 5 1/2" (140) centers. 16 ga. (1.6) galv. steel vee groove design. Parallel or opposed action.
- Linkage:** Concealed type totally enclosed within the frame and out of the airstream. Plated steel.
- Bearings:** 1/2" (13) dia. Celcon®.
- Axes:** 1/2" (13) dia. plated steel double bolted to blades.
- Drive Shaft:** 6" (152) long x 1/2" (13) dia. double-bolted fixed drive shaft on each damper section. The drive shaft is easily removed if required.

**Temperature Range:** -50°F to +250°F (-46°C to +121°C).

**Sizes (Duct W x H):**

Minimum		Maximum	
Single Section		Single Section	Multiple Section
Single Blade (parallel) 6" x 4" (152 x 102)	Two Blades (parallel or opposed) 8" x 10" (203 x 254)	48" x 72" (1219 x 1829)	96" x 144" (2438 x 3658)

## OPTIONS:

- ☐ ~~DB~~ Oilite bearings
- ☐ ~~SS~~ Stainless Steel construction
- ☐ ~~DLO~~ Lock on drive shaft
- ☒ **HLQ** Hand-locking quadrant (one required per damper section)
- ☐ ~~HLB~~ Hand-locking quadrant with 2" (51) stand-off bracket
- ☐ ~~Other~~

## PERFORMANCE:

Dampers are designed to operate in a clean, dry environment. For proper operation, dampers must be installed without racking. The hand quadrant must be installed on the indicated drive blade.

### Models 1810/1820 - Maximum Performance Ratings

Maximum Face Velocity	2000 fpm (10 m/s)
Maximum System Pressure	2.5 in. w.g. (625 Pa)

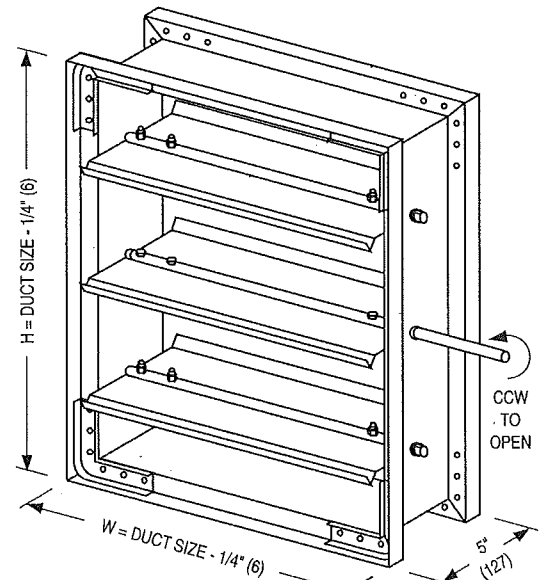
**Project:** St. Michael The Archangel Catholic Church

**Location:** Woodstock, GA

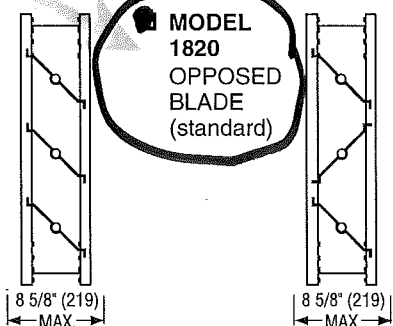
**Mech. Cont:** Paulson-Cheek Mechanical

**Mech. Engineer:** Leppard Johnson & Associates

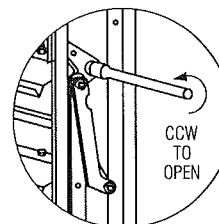
**Submitted by:** Georgia Air Associates



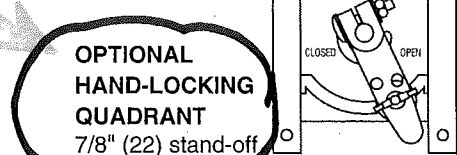
☐ **MODEL 1810**  
PARALLEL  
BLADE  
(optional)



The low profile frame illustration is used to maximize free area on units 10" (254) high and under.



**OPTIONAL  
LOCK-ON  
DRIVE SHAFT**



Dimensions are in inches (mm).

DATE	A SERIES	SUPERSEDES	DRAWING NO.
12 - 4 - 12	1800	10 - 1 - 10	1800-1



**APPROVED**

# HVAC Submittal Cover Sheet

## SECTION: 8 PRODUCT: Fire Dampers

Paulson-Cheek Mechanical, Inc.  
6145 Norhtbelt Parkway, Suite F  
Norcross, GA 30071

PHONE: 770-729-0076  
FAX: 770-729-1076

PROJECT: **Saint Michael The Archangel  
Catholic Church**  
LOCATION: **Woodstock, GA**

Paulson-Cheek Mechanical, Inc.

ARCHITECT'S/ENGINEER'S STAMP

### Paulson-Cheek Mechanical, Inc.

DATE RECEIVED:	06/25/14
MANUFACTURER:	Nailor Industries
SUPPLIER:	GAA
SUBMITTED DATE:	06/25/14

☒ NO ERRORS DETECTED

☐ CORRECT EXCEPTIONS NOTED

THIS APPROVAL OF SHOP DRAWINGS DOES  
NOT RELIEVE THE SUBCONTRACTOR OR VENDOR  
FROM THE REQUIREMENTS OF THE CONTRACT  
DOCUMENTS.

CHECKED BY:	Carden Clark
DATE CHECKED:	06/25/14



# GEORGIA AIR ASSOCIATES

## SUBMITTAL

PRODUCT: FIRE DAMPERS

PAGE: 1 OF 1

MANUFACTURER: NAILOR INDUSTRIES

FILE: \_\_\_\_\_

SPEC. PARA. NO.: 233330-2.9

DATE: 6/25/14

PROJECT: ST. MICHAEL THE ARCHANGEL CATHOLIC CHURCH ARCH: SIZEMORE GROUP ARCHITECTS  
LOCATION: WOODSTOCK, GA ENGR: LEPPARD JOHNSON & ASSOC.  
REMARKS: \_\_\_\_\_ CUST: PAULSON-CHEEK MECHANICAL

ITEM	QTY.	MODEL	DRAWING	WIDTH	HEIGHT	MARK (ROOM)
		0110G-A-12V 22 GA. x 12" SLEEVE	0100-6			TYPE 'A' @ WALL GRILLES VERTICAL MOUNT
		QS1 RETAINING ANGLES	QSRA			
1	1			48"	12"	@ 'B' GRILLE: AHU-4:RM.250
		0124-12V 22 GA. x 12" SLEEVE	0100-5			TYPE 'B' IN DUCTWORK VERTICAL MOUNT
		QS2 RETAINING ANGLES	QSRA			
2	1			24"	12"	OA:AHU-1
3	1			24"	14"	OA:AHU-2
4	1			24"	20"	SA:AHU-5
5	1			48"	30"	RA:AHU-2
6	1	(VERIFY SIZE)>>>		48"	30"	RA:AHU-1 (RM.232)
		0134-12V 22 GA. x 12" SLEEVE	0100-5			TYPE 'C' IN ROUND DUCTWORK VERTICAL MOUNT
		QS2 RETAINING ANGLES	QSRA			
7	3			6" ROUND		SA:AHU-11; OA:AHU-6,7
8	1			8" ROUND		OA:AHU-11
9	5			14" ROUND		SA:AHU-7,9; RA:AHU-6,9
10	1			18" ROUND		SA:AHU-6
		0134-12H 22 GA. x 12" SLEEVE	0100-5			TYPE 'C' IN ROUND DUCTWORK HORIZONTAL MOUNT
		QS2 RETAINING ANGLES	QSRA			
11	2			10" ROUND		SA:AHU-3,4
12	2			12" ROUND		SA:AHU-1,2



**STATIC INTEGRAL SLEEVE CURTAIN TYPE FIRE DAMPER  
FOR GRILLES**  
FOR USE IN STATIC SYSTEMS  
VERTICAL OR HORIZONTAL MOUNT  
**MODEL SERIES: 0100G (TYPES A, B & CR)**



**QUALIFICATIONS:**

- UL 555 & CAN/ULC-S112 CLASSIFIED FIRE DAMPER. 1 1/2 hr. label (File # R9492).
- Meets all the requirements of UL and NFPA 80, 90A and 101 for fire dampers in static HVAC systems, as well as IBC and NBC (Canada) Building Code requirements.
- City of New York Board of Standards and Appeals. Cal. No. 460-88-SA.
- California State Fire Marshal: Fire Damper Listing No. 3225-0935:0100.

Model Series 0100G features a special factory sleeve with unique 3/4" (19) grille mounting flanges, that simplifies installation, saves on field labor and eliminates the requirements for unsightly front retaining angles which commonly protrude from behind the grill. Steel grille with correctly located countersunk screw holes is available from Nailor and installs over and completely hides the mounting flanges. The static fire damper is offset in the sleeve to accommodate a single or double deflection supply air grille, single deflection supply air register or a return air grille or register.

**STANDARD CONSTRUCTION:**

- Frame:** 4 1/4" (108) wide, 22 ga. (0.85) roll-formed G60 galvanized steel.
- Blades:** Curtain type interlocking blades, 22 ga. (0.85) roll-formed G60 galvanized steel.
- Fusible Link:** 165°F (74°C) standard. UL Listed. 212°F (100°C) available.
- Sleeve:** 12" (305) x 22 ga. (0.85) G60 galvanized steel with 3/4" (19) wide grille mounting flanges.
- Blade Closure:** Vertical mount model; gravity. Horizontal mount models are equipped with stainless steel closure springs and galvanized steel locking ramps.

**Sizes (Duct W x H):**

Minimum	Maximum		
Single Section	Single Section		
Vertical/Horizontal	Type A	Type A	Type CR
4" x 4" (102 x 102)	24" x 24" (610 x 610)	24" x 21" (610 x 533)	22" dia. (559)

**DETERMINING SLEEVE LENGTH/DAMPER POSITION:**

To calculate sleeve length, determine wall thickness, add S dimension (3" [76] standard) and then add 3" (76) minimum for rear retaining angles and duct connection. Front of assembly fits flush with wall. Damper offset (dimension 'S') should accommodate grille selection depth, but fire damper blade centerline must remain within the plane of the wall or floor. The standard design shown above requires a minimum wall thickness of 5 1/8" (130).

**OPTIONS:**

- ☒ **QS1** Quick-set retaining angles (for the rear side of the damper).
- ☐ Non-standard sleeve length.
- ☐ Non-standard damper position.
- ☐ Non-standard sleeve gauge. Specify.

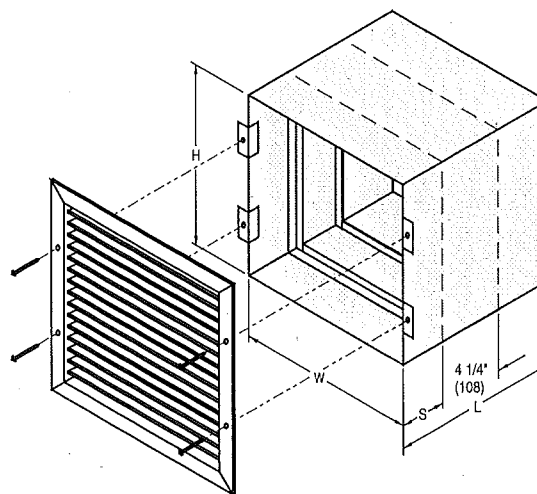
Project: St. Michael The Archangel Catholic Church

Location: Woodstock, GA

Mech. Cont: Paulson-Cheek Mechanical

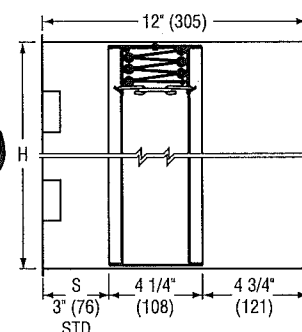
Mech. Engineer: Leppard Johnson & Associates

Submitted by: Georgia Air Associates



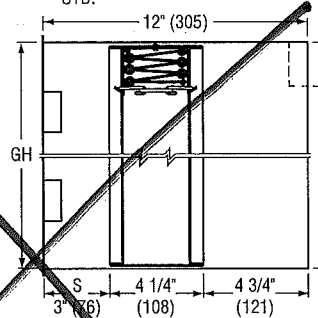
**STANDARD DAMPER/SLEEVE:**

**MODEL 0110G:  
TYPE A**

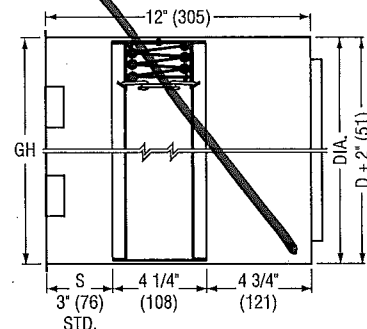


**MODEL 0120G:  
TYPE B DUCT  
CONNECTION  
ON ONE END  
GH = H + A**

Duct Height (H)	Dim. 'A'
6" - 17" (152 - 432)	2" (51)
18" - 21" (457 - 533)	3" (76)



**MODEL 0130G:  
TYPE CR ROUND  
DUCT CONNECTION  
ON ONE END  
GH = DIA. + 2" (51)**



Dimensions are in inches (mm).

DATE	B SERIES	SUPERSEDES	DRAWING NO.
4 - 28 - 14	FD	1 - 11 - 08	0100-6



# STATIC INTEGRAL SLEEVE CURTAIN TYPE FIRE DAMPERS

1 1/2 HR. LABEL • VERT. OR HORIZ. MOUNT  
FOR USE IN STATIC SYSTEMS

MODELS: ~~0114X-1X~~, 0124X-1X AND 0134X-1X



## QUALIFICATIONS:

- UL 555 & CAN/ULC-S112 CLASSIFIED FIRE DAMPER. 1 1/2 hr. label (File # R9492).
- Meets all the requirements of UL and NFPA 80, 90A and 101 for fire dampers in static HVAC systems, as well as IBC and NBC (Canada) Building Code requirements.
- City of New York Board of Standards and Appeals. Cal. No. 460-88-SA.
- California State Fire Marshal: Fire Damper Listing No. 3225-0935:0100.

Model Series 01X4 Integral Sleeve Static Curtain Fire Dampers ensure proper damper mounting in sleeve and can be shipped direct to job site for immediate installation, eliminating costly and inconvenient shop handling. UL approved for use where building codes require protection of HVAC ductwork penetrations in walls, partitions or floors that have a fire resistance rating of 2 hours or less. All units are constructed with 22 ga. (0.85) roll-formed G60 galvanized steel integral sleeve available in 12" (305), 14" (356) or 16" (406) length. Optional 'Quick-Set' retaining angles are available to complete the installation package.

## STANDARD CONSTRUCTION:

**Integral Sleeve/Frame:** 22 ga. (0.85) roll-formed G60 galvanized steel.  
01 x 4X - 12 Length 12" (305)

~~01 x 4X - 14 Length 14" (356)~~

~~01 x 4X - 16 Length 16" (406)~~

**Blades:** Curtain type interlocking blades, 22 ga. (0.85) roll-formed G60 galvanized steel.

**Fusible Link:** 165°F (74°C) standard. UL Listed.  
212°F (100°C) available.

**Blade Closure:** Vertical mount model; gravity.  
Horizontal mount models are equipped with stainless steel closure springs and galvanized steel locking ramps.

## OPTIONS:

☐ Non-standard temperature fusible link. Specify \_\_\_\_\_.

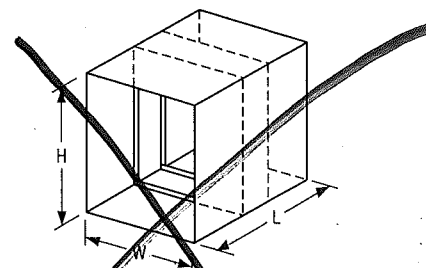
☐ QS1 Quick-set retaining angles (single set).

☒ QS2 Quick-set retaining angles (pair).

Hemmed Sleeve for slip and drive connection (Type A and B only):

☐ HME (both ends). ☐ HMT (one end).

☐ RT Pull-Tab Release: Permits simple reset of horizontal damper when access door is located below damper. (See dwg. ACC-PTR for details).

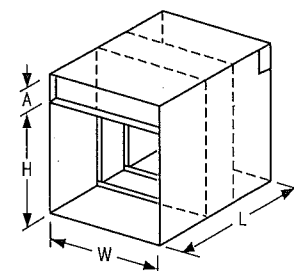


Models: 0114V-1X Vertical &  
0114H-1X Horizontal

Type A – Blades and frame in the airstream.

Min. size - 4" x 4" (102 x 102)

Max. size - 48" x 48" (1219 x 1219)



Models: 0124V-1X Vertical & ~~0124H-1X Horizontal~~

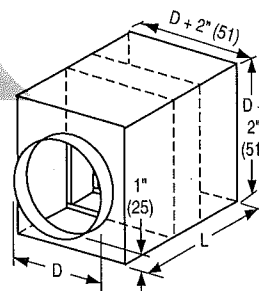
Type B – Blades out of airstream.

Min. size - Vertical 4" x 3" (102 x 76)

Min. size - Horizontal 4" x 4" (102 x 102)

Max. size - V or H 48" x 43" (1219 x 1092)

Damper Height (H)	Dim. 'A'
5" thru 17" (127 thru 432)	2" (51)
18" thru 21" (457 thru 533)	3" (76)
28" thru 36" (711 thru 914)	4" (102)
37" thru 43" (940 thru 1092)	5" (127)



Models: 0134V-1X Vertical & 0134H-1X Horiz.

Type CR – Round transition collars.

Blades partially in airstream

Min. size - Vertical 3" dia. (76)

Min. size - Horizontal 4" dia. (102)

Max. size - V or H 42" dia. (1067)

Dimensions are in inches (mm).

Project: St. Michael The Archangel Catholic  
Church

Location: Woodstock, GA

Mech. Cont: Paulson-Cheek Mechanical

Mech. Engineer: Leppard Johnson & Associates

Submitted by: Georgia Air Associates

DATE	B SERIES	SUPERSEDES	DRAWING NO.
4 - 28 - 14	FD	2 - 18 - 05	0100-5





# "QUICK-SET" RETAINING ANGLES FOR ALL SLEEVED FIRE ~~AND~~ ~~COMBINATION FIRE/SMOKE~~ DAMPERS MODELS: QS1 AND QS2

**"QUICK-SET" RETAINING ANGLES BOTH SIMPLIFY AND SPEED INSTALLATION,  
SAVING BOTH TIME AND MONEY.**

## BENEFITS:

- One piece angles are fastened together in the corners. Only two sets of angles to handle per damper (rather than four separate angles per side).
- Angles are shipped with damper - no sorting or matching.
- Provided with pre-drilled fastening holes on 2" (51) centers to ensure correct angle/sleeve attachment.
- Factory fabricated by Nailor to suit the individual fire damper.
- Reduced cost when compared to conventional retaining angles.
- Dampers can ship directly to the job site complete with all necessary installation sheet metal hardware (saves on double handling at contractor's shop).
- Help ensure a correct installation as per U.L. approved installation instructions.

The majority of installing contractors view fire damper installation as a costly time consuming and troublesome procedure. Eight conventional angles must be custom fabricated for each damper either in a sheet metal shop or at the job site and sized to suit each individual damper. Invariably, they are mislaid or lost and must be matched to each factory supplied damper.

The Nailor "Quick-Set" solution solves the majority of problems. They are pre-formed to fit and ship with the individual damper for ultimate convenience. "Quick-Set" angles are supplied with correctly spaced pre-drilled screw-holes to ensure a quick, easy and accurate installation for all integral sleeve Nailor fire and combination fire/smoke dampers - no measuring required.

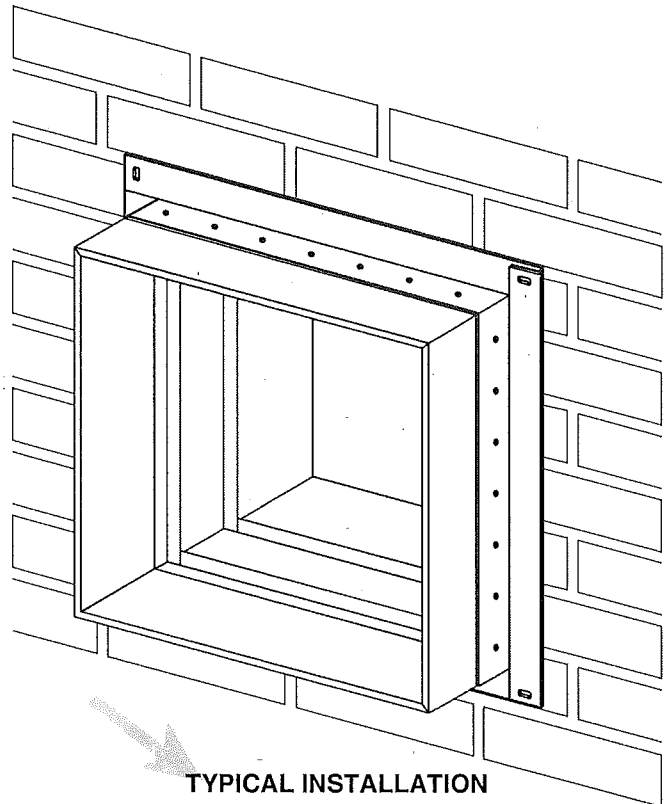
"Quick-Set" retaining angles provide the "complete" installation package. Simple, fast, convenient.

## MODELS:

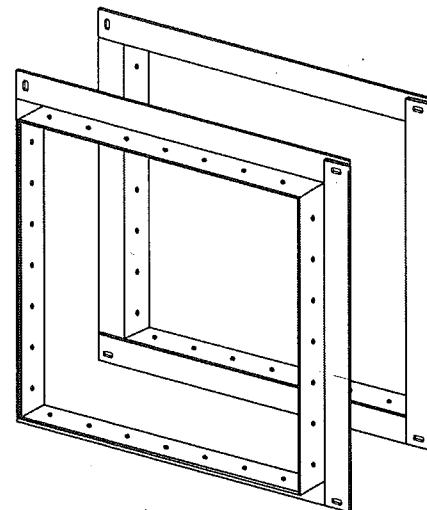
Nailor "Quick-Set" retaining angles are an accessory option for all dampers ordered with factory sleeves.

**QS2:** Two sides (pair). For standard installations where angles are installed on both sides of the fire partition.

**QS1:** One side (single set). For use in single side retaining angle installations and with grille mount and "out of wall" damper models.



**TYPICAL INSTALLATION**



**TYPICAL PAIR OF PRE-ASSEMBLED  
QUICK-SET' RETAINING ANGLES**



Refer to the UL or ULC  
Classification marking  
the product.

**Project:** St. Michael The Archangel Catholic  
Church

**Location:** Woodstock, GA

**Mech. Cont:** Paulson-Cheek Mechanical

**Mech. Engineer:** Leppard Johnson & Associates

**Submitted by:** Georgia Air Associates

Page 1 of 2

Dimensions are in inches (mm).

DATE	B SERIES	SUPERSEDES	DRAWING NO.
2 - 26 - 09	FD-ACC	6 - 5 - 03	QSRA



**APPROVED**

# HVAC Submittal Cover Sheet

## SECTION: 9 PRODUCT: Line Dampers

Paulson-Cheek Mechanical, Inc.  
6145 Norhtbelt Parkway, Suite F  
Norcross, GA 30071

PHONE: 770-729-0076  
FAX: 770-729-1076

PROJECT: **Saint Michael The Archangel  
Catholic Church**  
LOCATION: **Woodstock, GA**

Paulson-Cheek Mechanical, Inc.

ARCHITECT'S/ENGINEER'S STAMP

### Paulson-Cheek Mechanical, Inc.

DATE RECEIVED: 06/25/14  
MANUFACTURER: Jer-Air  
SUPPLIER: GAA  
SUBMITTED DATE: 06/25/14

☒ NO ERRORS DETECTED

☐ CORRECT EXCEPTIONS NOTED

THIS APPROVAL OF SHOP DRAWINGS DOES  
NOT RELIEVE THE SUBCONTRACTOR OR VENDOR  
FROM THE REQUIREMENTS OF THE CONTRACT  
DOCUMENTS.

CHECKED BY: Carden Clark  
DATE CHECKED: 06/25/14



## GEORGIA AIR ASSOCIATES

### SUBMITTAL

PRODUCT: FLEXIBLE DUCTWORK, TAKE-OFF FITTINGS  
AND LINE DAMPERS

PAGE: 1 OF 1

MANUFACTURER: ATCO/JER-AIR

FILE: \_\_\_\_\_

SPEC. PARA. NO.: 233330-2.8; MECH. DWGS.

DATE: 6/25/14

PROJECT: ST. MICHAEL THE ARCHANGEL CATHOLIC CHURCH ARCH: SIZEMORE GROUP ARCHITECTS

LOCATION: WOODSTOCK, GA ENGR: LEPPARD JOHNSON & ASSOC.

REMARKS: \_\_\_\_\_ CUST: PAULSON-CHEEK MECHANICAL

<u>QTY:</u>	<u>MODEL:</u>	<u>SIZE:</u>	<u>DESCRIPTION:</u>
75'	UPC#036-R6.0-06	6"	FLEXIBLE DUCTWORK
75'	UPC#036-R6.0-08	8"	FLEXIBLE DUCTWORK
175'	UPC#036-R6.0-10	10"	FLEXIBLE DUCTWORK
200'	UPC#036-R6.0-12	12"	FLEXIBLE DUCTWORK
1	AT-501-10	10"	45 DEGREE FITTINGS W/ DAMPER (SUPPLY)
29	AT-501-12	12"	45 DEGREE FITTINGS W/ DAMPER (SUPPLY)
1	AT-501-14	14"	45 DEGREE FITTINGS W/ DAMPER (SUPPLY)
6	RATDS-06	6"	SADDLE FITTINGS W/ SCOOP & DAMPER (SUPPLY)
9	RATDS-08	8"	SADDLE FITTINGS W/ SCOOP & DAMPER (SUPPLY)
23	RATDS-10	10"	SADDLE FITTINGS W/ SCOOP & DAMPER (SUPPLY)
24	RATDS-12	12"	SADDLE FITTINGS W/ SCOOP & DAMPER (SUPPLY)
4	DS-06	6"	LINE DAMPERS (SUPPLY)
2	DS-08	8"	LINE DAMPERS (SUPPLY)
5	DS-10	10"	LINE DAMPERS (SUPPLY)
1	DS-12	12"	LINE DAMPERS (SUPPLY)
3	DS-14	14"	LINE DAMPERS (RETURN)

#### Notes:

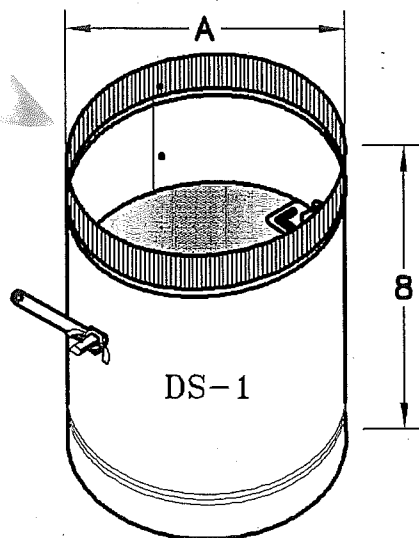
- 1) Flexible duct is based on 5' per runout to supply diffusers, except 'E' slot diffusers which have 3' of flexible duct maximum per Detail 1/M601. No flexible duct provided at returns.



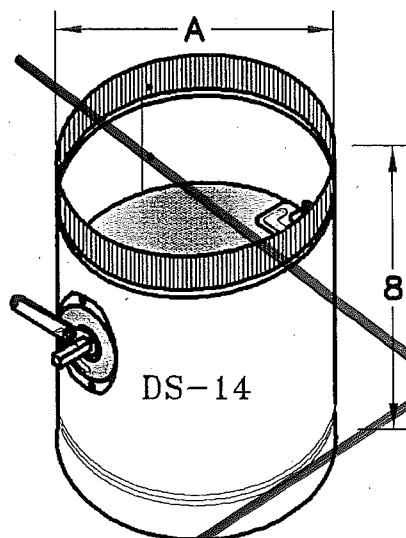
MODEL #

DS

DESCRIPTION:  
DAMPER SECTIONS  
(LIGHT GAUGE)

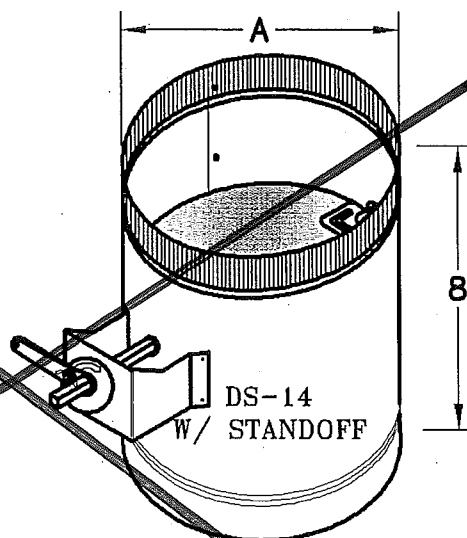


DS-1



DS-14

$\frac{1}{4}$ " HARDWARE



DS-14  
W/ STANDOFF

WITH 2" STANDOFF  
QUADRANT AND  $\frac{1}{4}$ "  
HARDWARE

### PRODUCT NOTES:

DAMPER SECTION FITTINGS ARE  
CONSTRUCTED OF GALVANIZED SHEET  
METAL OF LOCK FORMING AND ROLL  
FORMING QUALITY WITH RIVETED  
CONSTRUCTION.

BARREL EXIT IS BEADED AND CRIMPED.

DAMPER BLADE CAN BE CONSTRUCTED  
WITH 28, 26, 24 OR 22 GAUGE  
MATERIAL.

FACTORY ASSEMBLED DAMPER HARDWARE.

WITH OR WITHOUT 2" STANDOFF  
QUADRANT WITH  $\frac{1}{4}$ " AXLE SHAFT.

### SIZES AVAILABLE:

A

4"  
5"  
6"  
7"  
8"  
9"  
10"  
12"  
14"  
16"  
18"

Project: St. Michael The Archangel Catholic  
Church

Location: Woodstock, GA

Mech. Cont: Paulson-Cheek Mechanical

Mech. Engineer: Leppard Johnson & Associates

Submitted by: Georgia Air Associates

**APPROVED**



# HVAC Submittal Cover Sheet

**SECTION: 10**  
**PRODUCT: Wall Louvers**

Paulson-Cheek Mechanical, Inc.  
6145 Norhtbelt Parkway, Suite F  
Norcross, GA 30071

PHONE: 770-729-0076  
FAX: 770-729-1076

PROJECT: **Saint Michael The Archangel  
Catholic Church**  
LOCATION: **Woodstock, GA**

Paulson-Cheek Mechanical, Inc.

ARCHITECT'S/ENGINEER'S STAMP

**Paulson-Cheek Mechanical, Inc.**

DATE RECEIVED: 06/25/14  
MANUFACTURER: United Enertech  
SUPPLIER: GAA  
SUBMITTED DATE: 06/25/14

☒ NO ERRORS DETECTED

☐ CORRECT EXCEPTIONS NOTED

THIS APPROVAL OF SHOP DRAWINGS DOES  
NOT RELIEVE THE SUBCONTRACTOR OR VENDOR  
FROM THE REQUIREMENTS OF THE CONTRACT  
DOCUMENTS.

CHECKED BY: Carden Clark  
DATE CHECKED: 06/25/14

FAX TO: (404) 605-0690 Brian Rucks  
( ) - Carl Trevathan

**The Winter Construction Company**  
191 Peachtree St., Suite 2100  
Atlanta, Georgia 30303  
Phone: 404-588-3300  
Fax: 404-223-1146

## Request for Information



**St. Michael the Archangel Catholic Church**  
**Winter Project No: 14-044**  
**Location: 490 Arnold Mill Road**

**RFI #: 58**

**To:** Brian Rucks (Sizemore Group)  
**cc:**

**Reason for  
Request:**

- |                                     |                          |
|-------------------------------------|--------------------------|
| <input type="checkbox"/>            | Insufficient Information |
| <input checked="" type="checkbox"/> | Engineering Conflict     |
| <input type="checkbox"/>            | Alternative Proposal     |
| <input type="checkbox"/>            | Other                    |

**Drawing #:**  
**Detail #:**  
**Spec Sect:**

**Sub / Vendor:** PAULSON-CHEEK MECH, INC.  
(Subcontractor RFI # 1)

**Issue:**

In comparing the mechanical plans with the architectural drawings for this project, we have discovered some discrepancies regarding the louvers, as detailed below and on the attached drawings. Please forward this to the engineer of record and the architect for clarification.

**Louver L1:**

Spec on mech. drawing: .35 sq ft free area  
Size provided in submittal: 12" x 12"  
Size on arch. drawing: Not shown  
Action needed: Confirm that 12" x 12" is correct size

L1 Louver 12" x 12" is  
acceptable. BER  
10/28/2014

**Louver L2:**

Spec on mech. drawing: 1.26 sq ft free area  
Size provided in submittal: 24" x 18"  
Size on arch. drawing: Not shown  
Action needed: Confirm that 24" x 18" is correct size

L2 Louver 24" x 18" is  
acceptable. BER  
10/28/2014

**Louver L3:**

Spec on mech. drawing: .7 sq ft free area  
Size provided in submittal: 24" x 12"  
Size on arch. drawing: 24" x 24"  
Action needed: Confirm that 24" x 12" is correct size

L3 Louver 24" x 12" is  
acceptable. BER  
10/28/2014

**Louvers L4 and L5:**

Spec on mech. drawing: 2.9 sq ft free area  
Size provided in submittal: 36" x 24"  
Size on arch. drawing: 48" x 48"  
Action needed: Confirm that 36" x 24" is correct size

L4 and L5 Louver should be 48"  
x 48" to match architectural.  
B.O. Louver at 119'-4"  
BER 10/28/2014

**Louvers L6 and L7:**

Spec on mech. drawing: 8 sq ft free area  
Size provided in submittal: None; these were originally shown as existing louvers (change order is attached)  
Size on arch. drawing: 54" diameter  
Action needed: Confirm that 54" diameter is correct size

L6 and L7 Louver  
Diameter should be 60" as  
shown on 9/A404 and 8/  
A801. BER 10/28/2014

Your reply is required prior to: 10/27/2014  
For and on Behalf of The Winter Construction Company  
**Dated:** 10/22/2014

Signed: Chase Pence  
Title: Project Engineer

**Response:** Pam Immekus at Leppard Johnson has reviewed this information and finds it acceptable.  
10/28/2014

For and on Behalf of Sizemore Group

Dated: 10/28/2014

Signed: Brian Rucks

Title: Project Architect

---

**Trades Affected:**

**Resultant Delay:**

**Schedule Impact:**

**Cost Impact:**

**Attachments:**      Louver Size Drawings.pdf

Distribution:

Response Distribution:

TWCC's Project RFI # is: 58



PRODUCT: WALL LOUVERS PAGE: 1 OF 1  
MANUFACTURER: UNITED ENERTECH FILE: \_\_\_\_\_  
SPEC. PARA. NO.: MECH. DWGS. DATE: 11/24/14

PROJECT: ST. MICHAEL THE ARCHANGEL CATHOLIC CHURCH	ARCH: SIZEMORE GROUP ARCHITECTS
LOCATION: WOODSTOCK, GA	ENGR: LEPPARD JOHNSON & ASSOC.
REMARKS:	CUST: PAULSON-CHEEK MECHANICAL

**NOTES :**

- 1) LOUVERS ARE UNDERSIZED BY 1/2" IN BOTH DIMENSIONS.
- 2) \* LOUVERS ARE SUBMITTED WITH STANDARD MILL FINISH. PLEASE ADVISE IF FACTORY FINISH IN COLOR SELECTED BY ARCHITECT IS REQUIRED.
- 3) NO SPECIFICATIONS WERE FOUND ON WALL LOUVERS IN DIVISION 23 OR MECHANICAL DRAWINGS.

REVISIONS (11/24/14) :

- 1) UPDATED LOUVER SIZES FOR L4 & L5 TO 48"x48" PER RFI #58.



# SUBMITTAL DATA

## MODEL FL-D-4

## HIGH PERFORMANCE 4" FIXED LOUVER

### STANDARD CONSTRUCTION:

**Frame:** .081 Extruded Aluminum, 4.19" Deep

**Blade:** .081 Extruded Aluminum positioned on a 37° angle on approximately 2.88" centers

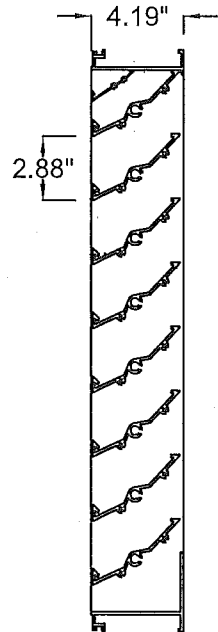
**Birdscreen:** .75" x .051" Flattened Aluminum in removable frame. Screen is mounted as standard on inside (rear) as looking from exterior of building.

**Finish:** Mill Aluminum (Std.)

**Minimum Size:** 12 x12

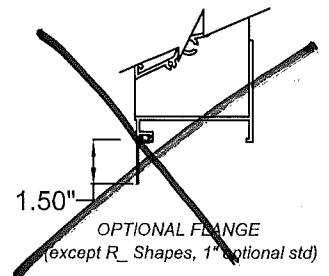
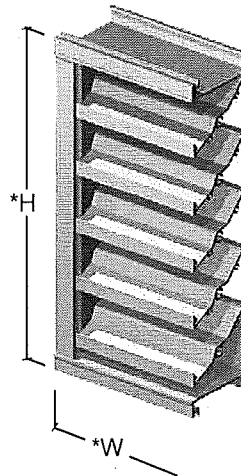
**Maximum Single Section:** 120"w x 84"h or 84"w x 120"h

**Note:** 10' max width



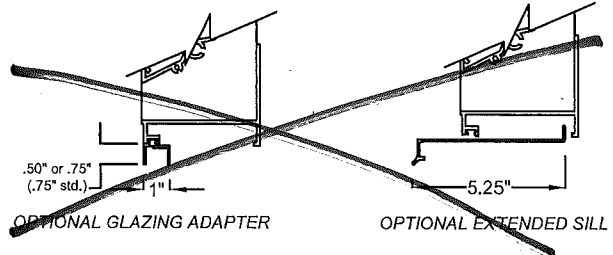
### OPTIONS:

- ☐ Flanged Frame (1.50" std.), (1" std for shapes R\_)
- ☐ Custom Flange (1", 2", or 3"), (1.5", 2", or 3" for shapes R\_)
- ☐ Extended Sill
- ☐ Glazing Adapter (.50" or .75")
- ☐ Insect Screen (Other Screens Available, See Screen Page)
- ☐ Filter Racks (no screen)
- ☐ Security Bars
- ☐ Hinged Sub Frame
- ☐ Split Deflection 45°/0° Blades
- ☐ Welded Construction (Wind Load +/- 50 psf)
- ☐ .125" Construction
- ☐ Blank-off, Alum., non-insulated, no screen, non-removeable
- ☐ Blank-off, Alum., non-insulated, with bird screen or insect screen
- ☐ Blank-off, Alum., insulated double wall, with bird screen, removable
- ☐ Blank-off, Alum., insulated double wall, no screen, non-removeable



### AVAILABLE FINISHES:

- ☐ Powder Polyester TGIC (2 coats) baked on at 440°F, 2.5 to 3.5 mils Meets AAMA-2603 Standards
- ☐ Powder Super durable polyester (2 coats) baked on at 410°F, 2.5 to 3.5 mils Meets AAMA-2604-05 Standards
- ☐ Acrylic baked enamel (ACRA-BOND® ULTRA) by AkzoNobel baked on at 350°F, 0.8 to 1.2 mils dry Meets AAMA-2603 Standards
- ☐ Kynar® (ALUM\*A\*STAR®) 2 coats by AkzoNobel baked on at 450°F, 1.2 to 1.6 mils dry Meets AAMA-2604-05 Standards
- ☐ Kynar 500® or HYLAR® 5000 70% TRINAR® (2 coats) by AkzoNobel baked on at 460°F, 1.2 to 1.6 mils dry, Meets AAMA-2605-05 Standards
- ☐ Kynar 500® or HYLAR® 5000 (70% Tri-Escent II) (2 coats) by AkzoNobel, a superior finish to other metallic or anodized finishes. A blend of mica, ceramic, and inorganic pigments creates subtle yet dazzling design that goes beyond metallic color without the requirement of a clear coat. 14 standard colors - custom colors available. Baked on at 415°F, 1.4 to 1.8 mils dry, meets AAMA 2605-05.
- ☐ Clear Anodize 204 R-1 Class II (AA-C22A31)(0.4 to 0.7 mil)
- ☐ Clear Anodize 215 R-1 Class I (AA-C22A41)(>0.7 mil)
- ☐ Integral Color Anodize (AA-C22A42)(>0.7 mil)
  - Clear coat available for all above finishes.
  - Hylar® 5000 is a registered trademark of Solvay Solexis, Inc.
  - Kynar® 500 is a registered trademark of Arkema.
  - ALUM\*A\*STAR® 50 and TRINAR® are registered trademarks of AkzoNobel
  - ACRA-BOND® ULTRA is a registered trademark of AkzoNobel



\*Width and Height dimensions are approximately 1/4" under listed size.

Due to continuing research, United Enertech reserves the right to change specifications without notice.



3005 South Hickory Street  
Chattanooga, Tennessee 37407  
Tel: (423) 698-7715  
Fax: (423) 698-6629  
www.unitedenertech.com

MODEL FL-D-4 (Drainable Blade w/ Jamb Gutters & Downspouts)

DRAWN BY: CLJ	DATE: April 2010	REV. DATE: February 2010	REV. NO. 1	APPROVED BY: BGT	DWG. NO.: A-2
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## SUGGESTED SPECIFICATION

Finish and install louvers as hereinafter specified where shown on plans or as described in schedules. Louvers shall be stationary drainable type with drain gutters in each blade and downspouts in jambs and mullions. Stationary drainable blades shall be contained within a 4.19" frame. Louver components (heads, jambs, sills, blades, and mullions) shall be factory assembled by the louver manufacturer. Louver sizes too large for shipping shall be built up by the contractor from factory assembled louver sections to provide overall sizes required. Louver design shall incorporate structural supports required to withstand a wind load of 25 lbs. per sq. ft. (optional 50 lbs. per sq. ft.) (equivalent of a 100 mph wind).

Louvers shall be United Enertech FL-D-4, 6063-T5 aluminum construction as follows:

FRAME: 4.19" deep, .081" nominal wall thickness

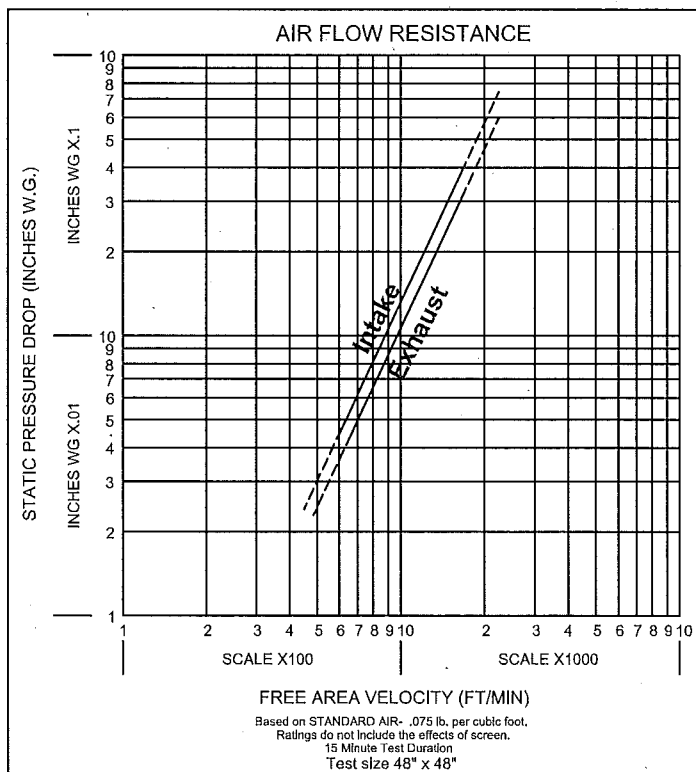
BLADES: .081" nominal wall thickness. Blades are positioned at 39° angle and spaced approximately 2.88" center to center.

SCREEN: .75" x .051" (19 x 1.3) expanded, flattened aluminum in removable frame.

FINISH: Select finish specification from United Enertech Finishes brochure.

Published louver performance data bearing the AMCA Certified Ratings seal for Air Performance & Water Penetration must be submitted for approval prior to fabrication and must demonstrate pressure drop and water penetration equal to or less than the United Enertech model specified.

## PERFORMANCE DATA



AMCA Standard 500 provides a reasonable basis for testing and rating louvers. Testing to AMCA 500-L is performed under a certain set of laboratory conditions. This does not guarantee that other conditions will not occur in the actual environment where louvers must operate. The louver system should be designed with a reasonable safety factor for louver performance. To ensure protection from water carryover, design with a performance level somewhat below maximum desired pressure drop and .01 oz./sq. ft. of water penetration.

Beginning point of **WATER PENETRATION**  
for **MODEL FL-D-4** lies above  
**1250 fpm**  
free area velocity at .01 oz. of water  
(penetration)



United Enertech Corporation certifies that the louver model shown hereon is licensed to bear the AMCA seal. The ratings shown are based on tests and procedures performed in accordance with the AMCA publication 511 and comply with the requirement of the AMCA Certified Ratings Program. The AMCA Certified Ratings Seal applies to Air Performance and Water Penetration ratings.

FL-D-4 FREE AREA CHART (SQUARE FEET)

Louver Height Inches	Louver Width In Inches																			Louver Height Inches
	12	18	24	30	36	42	48	54	60	66	72	78	84	90	96	102	108	114	120	
12	0.32	0.51	0.71	0.91	1.10	1.30	1.50	1.70	1.89	2.09	2.29	2.48	2.68	2.88	3.08	3.27	3.47	3.67	3.86	12
18	0.55	0.90	1.24	1.59	1.93	2.28	2.63	2.97	3.32	3.66	4.01	4.35	4.70	5.04	5.39	5.73	6.08	6.42	6.77	18
24	0.80	1.30	1.80	2.30	2.80	3.30	3.80	4.30	4.80	5.30	5.80	6.30	6.80	7.30	7.80	8.30	8.80	9.30	9.79	24
30	0.99	1.61	2.23	2.84	3.46	4.08	4.70	5.31	5.93	6.55	7.17	7.78	8.40	9.02	9.64	10.25	10.87	11.49	12.11	30
36	1.21	1.97	2.73	3.48	4.24	4.99	5.75	6.51	7.26	8.02	8.78	9.53	10.29	11.05	11.80	12.56	13.31	14.07	14.83	36
42	1.47	2.38	3.30	4.22	5.13	6.05	6.96	7.88	8.79	9.71	10.63	11.54	12.46	13.37	14.29	15.20	16.12	17.04	17.95	42
48	1.69	2.75	3.80	4.86	5.91	6.96	8.02	9.07	10.13	11.18	12.24	13.29	14.35	15.40	16.45	17.51	18.56	19.62	20.67	48
54	1.92	3.12	4.32	5.52	6.72	7.92	9.11	10.31	11.51	12.71	13.91	15.11	16.31	17.51	18.70	19.90	21.10	22.30	23.50	54
60	2.16	3.50	4.85	6.19	7.53	8.88	10.22	11.57	12.91	14.26	15.60	16.94	18.29	19.63	20.98	22.32	23.67	25.01	26.35	60
66	2.39	3.88	5.37	6.86	8.35	9.84	11.33	12.82	14.31	15.80	17.29	18.79	20.28	21.77	23.26	24.75	26.24	27.73	29.22	66
72	2.63	4.26	5.90	7.54	9.18	10.81	12.45	14.09	15.73	17.36	19.00	20.64	22.28	23.91	25.55	27.19	28.83	30.46	32.10	72
78	2.85	4.63	6.40	8.18	9.95	11.73	13.51	15.28	17.06	18.84	20.61	22.39	24.16	25.94	27.72	29.49	31.27	33.05	34.82	78
84	3.11	5.04	6.98	8.91	10.85	12.78	14.72	16.66	18.59	20.53	22.46	24.40	26.34	28.27	30.21	32.14	34.08	36.01	37.95	84
90	3.34	5.42	7.50	9.58	11.66	13.74	15.82	17.90	19.97	22.05	24.13	26.21	28.29	30.37	32.45	34.53	36.61	38.69	40.77	90
96	3.58	5.82	8.05	10.29	12.52	14.76	16.99	19.22	21.46	23.69	25.93	28.16	30.39	32.63	34.86	37.10	39.33	41.57	43.80	96
102	3.76	6.10	8.44	10.78	13.12	15.47	17.81	20.15	22.49	24.83	27.17	29.52	31.86	34.20	36.54	38.88	41.22	43.57	45.91	102
108	4.05	6.58	9.11	11.64	14.16	16.69	19.22	21.75	24.27	26.80	29.33	31.86	34.38	36.91	39.44	41.96	44.49	47.02	49.55	108
114	4.24	6.89	9.53	12.18	14.82	17.47	20.12	22.76	25.41	28.05	30.70	33.34	35.99	38.63	41.28	43.92	46.57	49.21	51.86	114
120	4.48	7.27	10.06	12.85	15.64	18.43	21.22	24.02	26.81	29.60	32.39	35.18	37.97	40.76	43.55	46.34	49.14	51.93	54.72	120



# HVAC Submittal Cover Sheet

SECTION: 11

**APPROVED**

## Grilles, Registers & Diffusers w/ Plenums & Cable-Op Dampers

Paulson-Cheek Mechanical, Inc.  
6145 Norhtbelt Parkway, Suite F  
Norcross, GA 30071

PHONE: 770-729-0076

FAX: 770-729-1076

PROJECT: **Saint Michael The Archangel  
Catholic Church**

LOCATION: **Woodstock, GA**

Paulson-Cheek Mechanical, Inc.

ARCHITECT'S/ENGINEER'S STAMP

### Paulson-Cheek Mechanical, Inc.

DATE RECEIVED: 06/25/14  
MANUFACTURER: Krueger  
SUPPLIER: GAA  
SUBMITTED DATE: 06/25/14

☒ NO ERRORS DETECTED

☐ CORRECT EXCEPTIONS NOTED

THIS APPROVAL OF SHOP DRAWINGS DOES  
NOT RELIEVE THE SUBCONTRACTOR OR VENDOR  
FROM THE REQUIREMENTS OF THE CONTRACT  
DOCUMENTS.

CHECKED BY: Carden Clark  
DATE CHECKED: 06/25/14



# GEORGIA AIR ASSOCIATES

## SUBMITTAL

PRODUCT: GRILLES, REGISTERS & DIFFUSERS

PAGE: 1 OF 1

MANUFACTURER: KRUEGER

FILE: \_\_\_\_\_

SPEC. PARA. NO.: 233713-2.1/3

DATE: 6/25/14

PROJECT: ST. MICHAEL THE ARCHANGEL CATHOLIC CHURCH

ARCH: SIZEMORE GROUP ARCHITECTS

LOCATION: WOODSTOCK, GA

ENGR: LEPPARD JOHNSON & ASSOC.

REMARKS: \_\_\_\_\_

CUST: PAULSON-CHEEK MECHANICAL

TAG	MODEL NO.	QTY	SIZE	FINISH	DWG. NO.	REMARKS
A-12x12**	51450*06*F22*12x12*44 w/ PRN100-06	4	6"	44 White	DS1452.1, DS1012	12x12 Lay-in w/ Plaster Frame, Aluminum, w/ Damper

**\*\* Please Verify frame style for 12x12 'A' diffusers in restrooms. (Surface Mount or Lay-in?)**

A	51450*06*F23*24x24*44	6	6"	44 White	DS1451.1	24x24 Lay-in, Aluminum
A	51450*08*F23*24x24*44	11	8"	44 White	DS1451.1	24x24 Lay-in, Aluminum
A	51450*10*F23*24x24*44	29	10"	44 White	DS1451.1	24x24 Lay-in, Aluminum
A	51450*12*F23*24x24*44	5	12"	44 White	DS1451.1	24x24 Lay-in, Aluminum
B-Ceiling	EGC5*24x24*F23*44*N	15	22x22	44 White	GS0208.1	24x24 Lay-in, 22x22 Neck
B-Wall**	S580H*16x10*F22*44	1	16x10	44 White	GS0209.4	Surface Mount, Aluminum
B-Wall**	S580H*48x12*F22*44	2	48x12	44 White	GS0209.4	Surface Mount, Aluminum
B-Wall**	S580H*16x16*F22*44	2	16x16	44 White	GS0209.4	Surface Mount, Aluminum
B-Wall**	S580H*24x24*F22*44	1	24x24	44 White	GS0209.4	Surface Mount, Aluminum
B-Wall** @AHU-1,2**	S580H*60x24*F22*44	2	60x24**	44 White	GS0209.4	Surface Mount, Aluminum

**\*\* 'B' Grilles shown in wall application have been changed to fixed bar return grilles (similar to tag 'D'). No OBD's are provided at these grilles since they are transfer air application or return application with MVD shown in return ducts for balancing.**

E**	DFL15*48x01*FF*44*01	48	48" Long	44 White	GC0110.3, GC0100.7, GC0101.4	Type FF Exposed Flange Frame w/ Concealed Mounting, One (1) 1-1/2" Wide Slot
E-Plenums	DFPI15*48x01*12*FF*01 w/ RT-150-12 Cable-Operated Dampers	48	12" Inlet	Mill	GC0105.11 -GC110.7; RT-150	48" Long Insulated Plenums w/ Face-Operable Cable Dampers

**\*\* 'E' slot diffuser notes:**

- 1) Please Verify frame style for slot diffusers (sidewall application). Border Type 'AS' specified in schedule for Titus FL15/FT15 Series was not found in Titus literature. Standard Exposed Flange frame with Concealed Fastening is submitted.
- 2) Some 'E' slot diffusers are shown side-by-side (ie. Two 4' diffusers). Please Advise if these should have continuous 8' appearance or whether two separate 4' long slots are required, as submitted.

### Notes:

- 1) Please Verify all frame styles prior to release.
- 2) Square-to-round transitions at Return/Exhaust Grilles are to be provided by others.
- 3) Tags 'C' & 'D' were not used. (None shown on plans)

**A/E Verify**

TAG: A-12x12

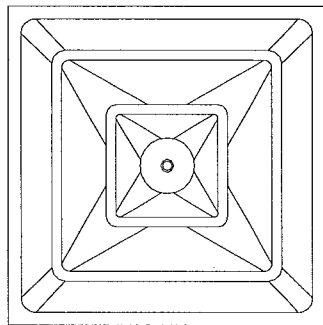
Project: St. Michael The Archangel Catholic Church  
 Location: Woodstock, GA  
 Mech. Cont: Paulson-Cheek Mechanical  
 Mech. Engineer: Leppard Johnson & Associates  
 Submitted by: Georgia Air Associates

**SUBMITTAL SHEET**  
 Form Number DS1452.1 Effective Date 11/01  
 Replaces Form DS1452

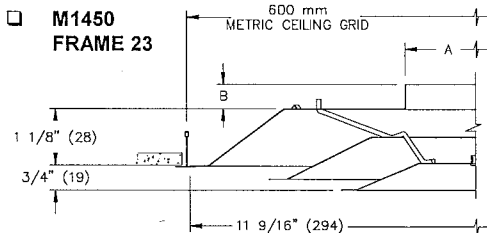


**SERIES ~~1450 & 51450~~ / ~~M1450~~**  
**SQUARE DIFFUSER FOR 12"x 12" & (300x300) GRIDS**

**ROUND NECK**



**FACE VIEW FRAME 23**  
 SEE FRAME DETAILS FOR DIMENSIONS



FRAME 23 LAY IN APPLICATION  
 FOR METRIC SYSTEM REQUIREMENTS

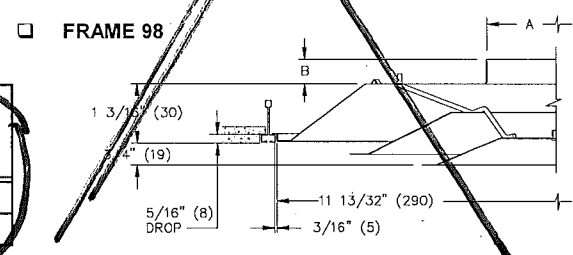
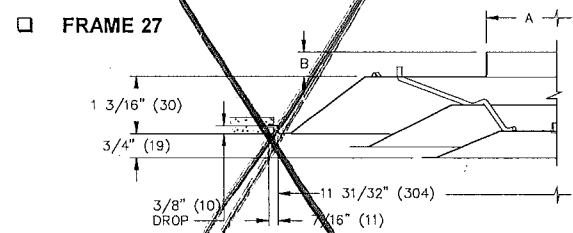
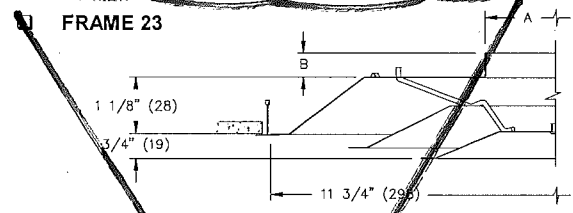
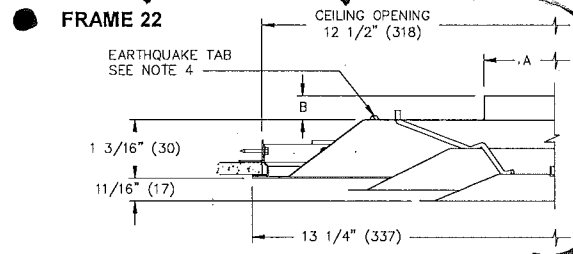
NOMINAL NECK SIZE	A	1450 M1450 B	51450 B
6	5 7/8" (149)	1 1/2" (38)	1 1/2" (38)
8	7 7/8" (200)	1 1/2" (38)	1 1/2" (38)

**NOTES:**

- ~~1. 1450 / M1450 CONSTRUCTION IS STEEL.~~
2. 51450 CONSTRUCTION IS ALUMINUM.
3. FRAME 22 ALWAYS INCLUDES AN ALUMINUM MOUNTING FRAME.
4. ALL MODELS COME WITH TWO EARTH-QUAKE TABS.
5. STANDARD FINISH IS 44 WHITE.

**ACCESSORIES:**

DAMPERS ARE TO BE ORDERED SEPARATELY.



**1450 / 51450 FRAME STYLES**

**DIMENSIONS ARE GIVEN AS  
 INCHES (MM)**

TAG: Damper @ A'-12x12

Project: St. Michael The Archangel Catholic  
Church

Location: Woodstock, GA

Mech. Cont: Paulson-Cheek Mechanical

Mech. Engineer: Leppard Johnson & Associates

Submitted by: Georgia Air Associates

## SUBMITTAL SHEET

Form Number DS1012 Effective Date 2/97

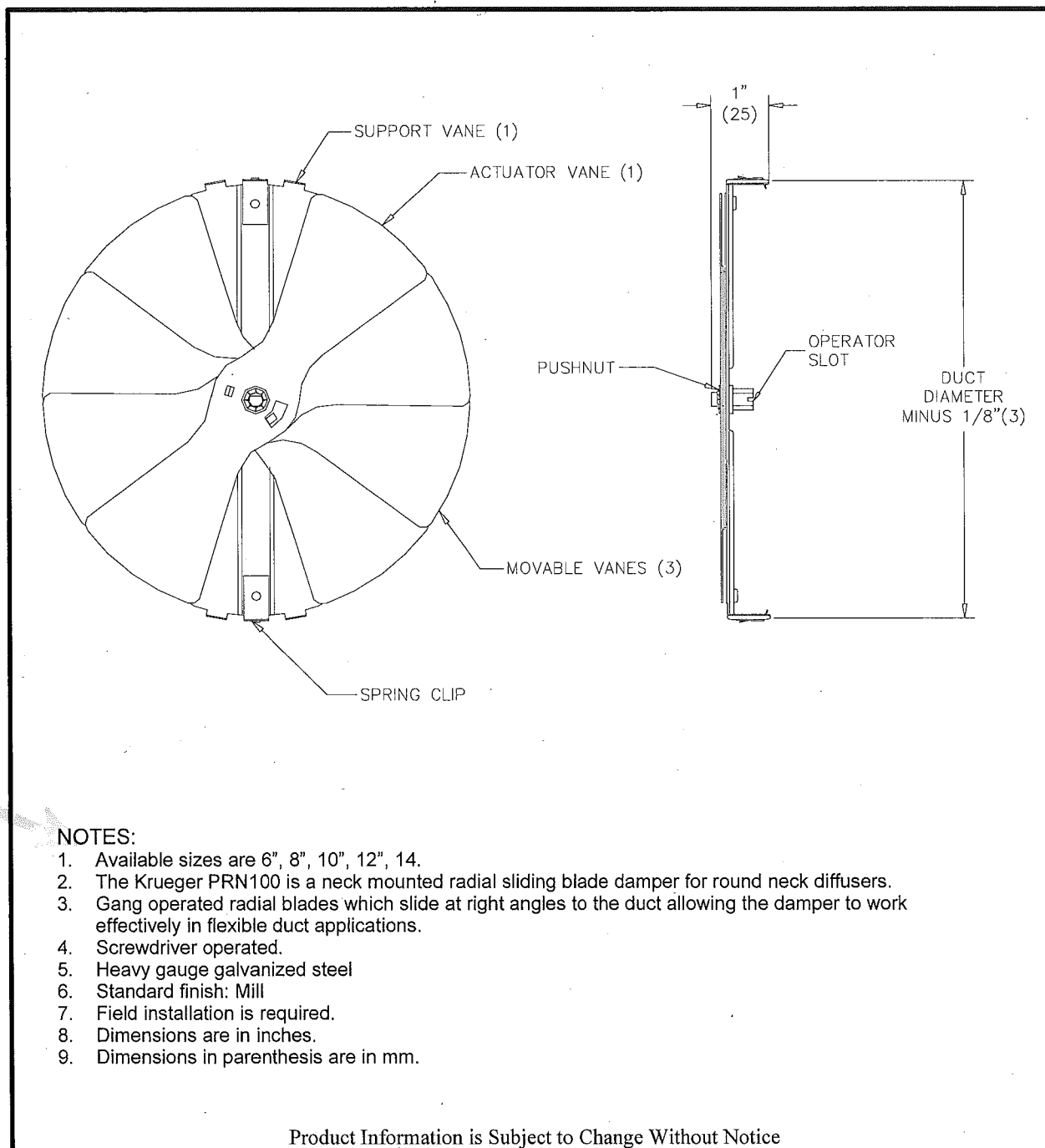
replaces Form # 3339



**KRUEGER**  
Excellence in Air Distribution

### PRN100 SERIES

### Sliding Blade Damper for Round Neck Diffusers



#### NOTES:

1. Available sizes are 6", 8", 10", 12", 14.
2. The Krueger PRN100 is a neck mounted radial sliding blade damper for round neck diffusers.
3. Gang operated radial blades which slide at right angles to the duct allowing the damper to work effectively in flexible duct applications.
4. Screwdriver operated.
5. Heavy gauge galvanized steel
6. Standard finish: Mill
7. Field installation is required.
8. Dimensions are in inches.
9. Dimensions in parenthesis are in mm.

Product Information is Subject to Change Without Notice

TAG: A-24x24

Project: St. Michael The Archangel Catholic Church

Location: Woodstock, GA

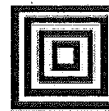
Mech. Cont: Paulson-Cheek Mechanical

Mech. Engineer: Leppard Johnson & Associates

Submitted by: Georgia Air Associates

## SUBMITTAL SHEET

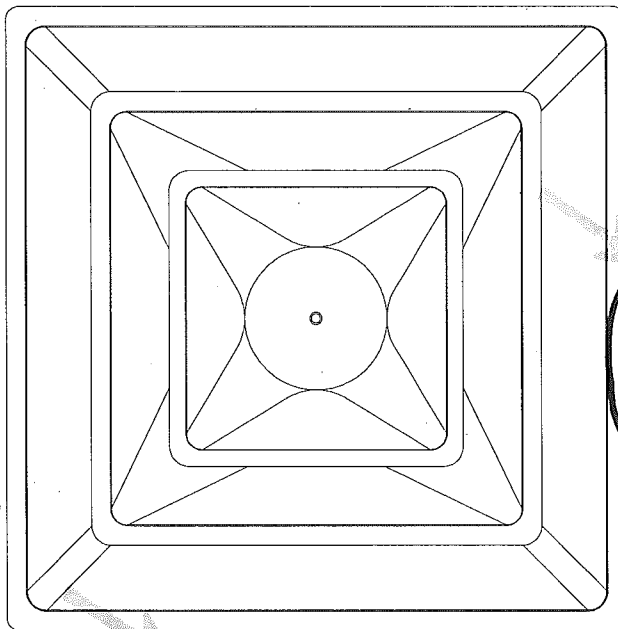
Form Number DS1451.1 Effective Date 11/01  
Replaces Form DS1451



**KRUEGER**  
Excellence in Air Distribution

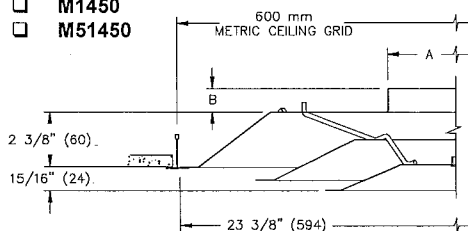
**SERIES ~~1450 & 51450~~ / ~~M1450 & M51450~~**  
**SQUARE DIFFUSER FOR 24"x 24" & (600x600) GRIDS**

**ROUND NECK**



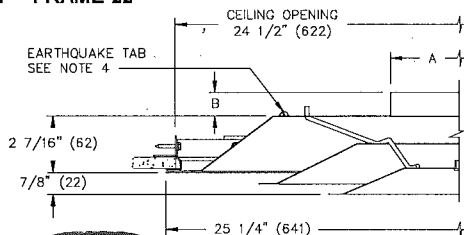
**FACE VIEW FRAME 23**

- ☐ M1450
- ☐ M51450

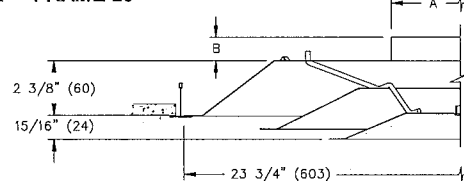


DIMENSIONS ARE GIVEN AS  
INCHES (MM)

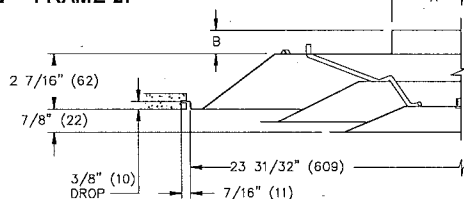
### FRAME 22



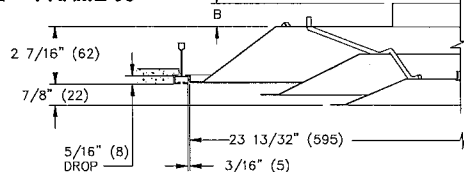
### FRAME 23



### FRAME 27



### FRAME 98



**FRAME STYLES**

NOMINAL NECK SIZE	A	1450 / M1450 B	51450 / M51450 B
06	5 7/8" (149)	1" (25)	1 1/2" (38)
08	7 7/8" (200)	1" (25)	1 1/2" (38)
10	9 7/8" (251)	1 1/2" (38)	1 1/2" (38)
12	11 7/8" (302)	1 1/2" (38)	1 1/2" (38)
14	13 7/8" (352)	1 1/2" (38)	1 1/2" (38)
15	14 7/8" (378)	1 1/2" (38)	1 1/2" (38)

### NOTES:

- ~~1. 1450 / M1450 CONSTRUCTION IS STEEL.~~
- 51450 / M51450 CONSTRUCTION IS ALUMINUM.
- FRAME 22 ALWAYS INCLUDES AN ALUMINUM MOUNTING FRAME.
- ALL MODELS COME WITH TWO EARTHQUAKE TABS.
- STANDARD FINISH IS 44 WHITE.

### ACCESSORIES:

~~DAMPERS ARE TO BE ORDERED SEPARATELY.~~

Product Information is Subject to Change Without Notice

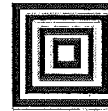
TAG: B-Ceiling

Project: St. Michael The Archangel Catholic Church  
Location: Woodstock, GA  
Mech. Cont: Paulson-Cheek Mechanical  
Mech. Engineer: Leppard Johnson & Associates  
Submitted by: Georgia Air Associates

## SUBMITTAL SHEET

Form Number GS0208.1 Effective Date 8/99

Replaces GS0208

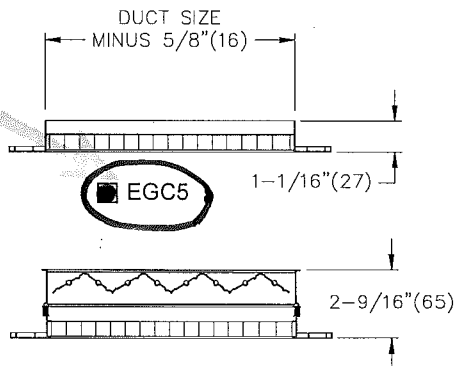
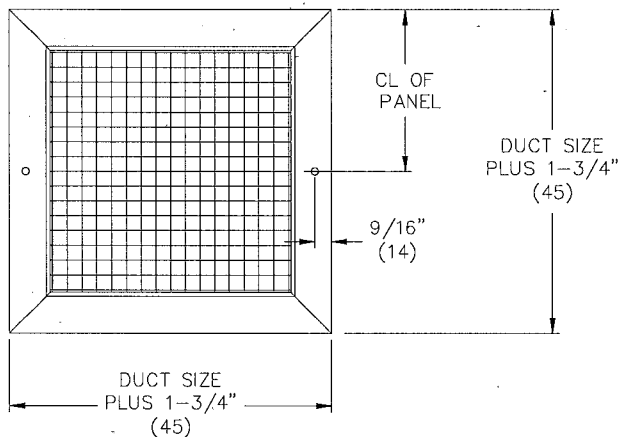


# KRUEGER

Excellence in Air Distribution

## EGC5 SERIES

Eggcrate Grille, 1/2" X 1/2" X 1/2" grid



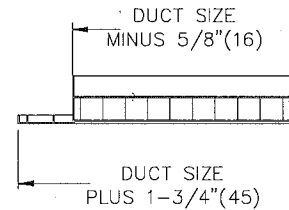
☐ EGC5 OBD

### NOTES:

1. Frame 22 shown. See frame style detail for frame dimensions.
2. Aluminum Eggcrate Core.
3. Standard finish 44 British white.
4. Dimensions are in inches.
5. Dimension in parenthesis are in mm.
6. Available neck size 6 x 6 to 48 x 48.
7. Eggcrate dimensions 1/2" x 1/2" x 1/2" (13 x 13 x 13).

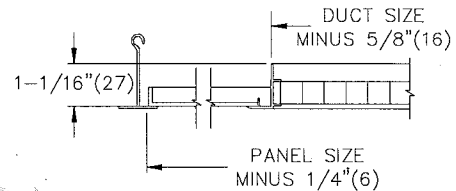
### ACCESSORIES:

- ☐ Steel opposed blade damper - Model OBD
- ☐ Aluminum opposed blade damper - Model OBD



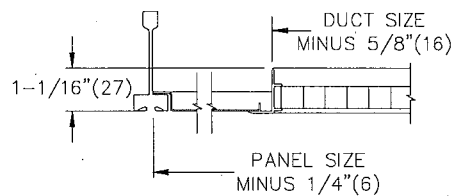
☐ F22 (Aluminum Frame)

☐ S22 (Steel Frame)



☒ F23 (Aluminum Frame)

☒ S23 (Steel Frame)



☐ F98 (Aluminum Frame)

STD PANEL SIZES:	
12" x 12"	(305 x 305)
24" x 12"	(610 x 305)
24" x 24"	(610 x 610)
48" x 24"	(1219 x 610)
48" x 48"	(1219 x 1219)

Product Information is Subject to Change Without Notice

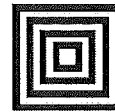


Project: St. Michael The Archangel Catholic Church  
 Location: Woodstock, GA  
 Mech. Cont: Paulson-Cheek Mechanical  
 Mech. Engineer: Leppard Johnson & Associates  
 Submitted by: Georgia Air Associates

TAG: B-Wall

# SUBMITTAL SHEET

Form Number GS209.4 Effective Date 05/13  
 Replaces Form GS0209.3

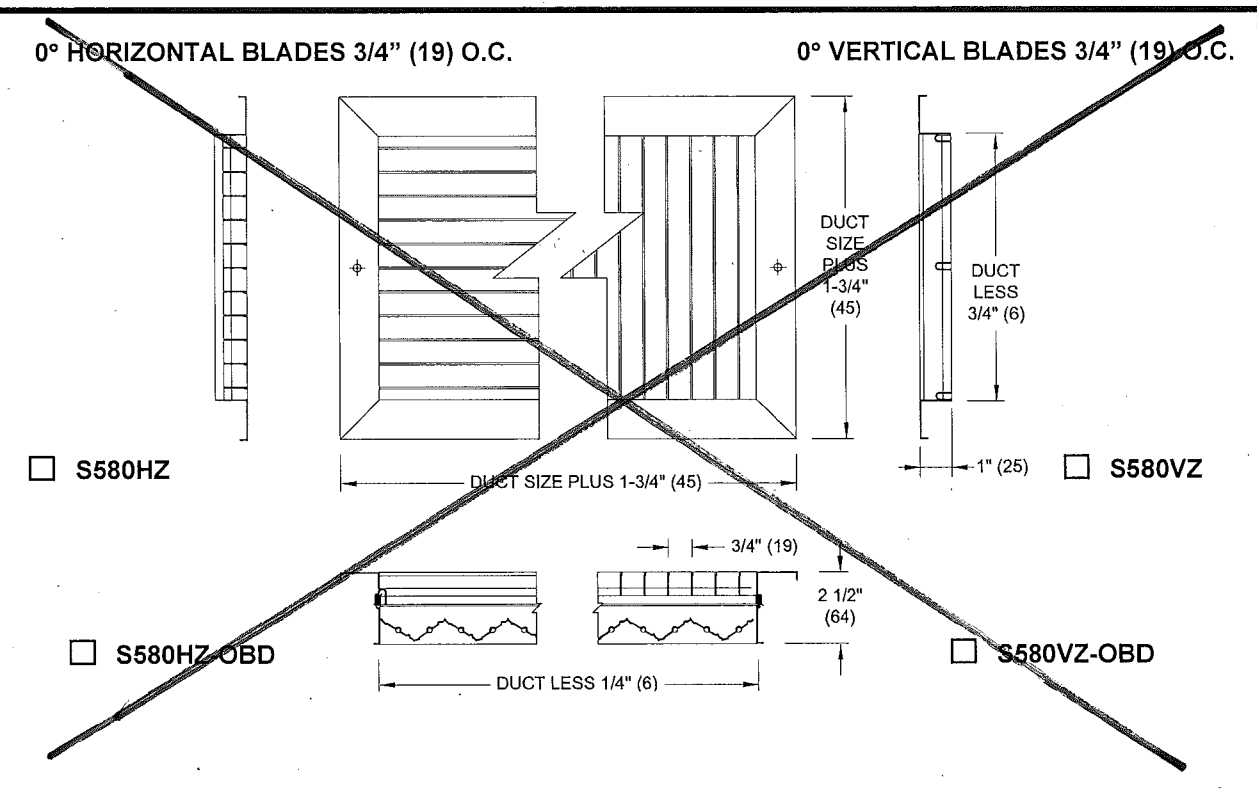
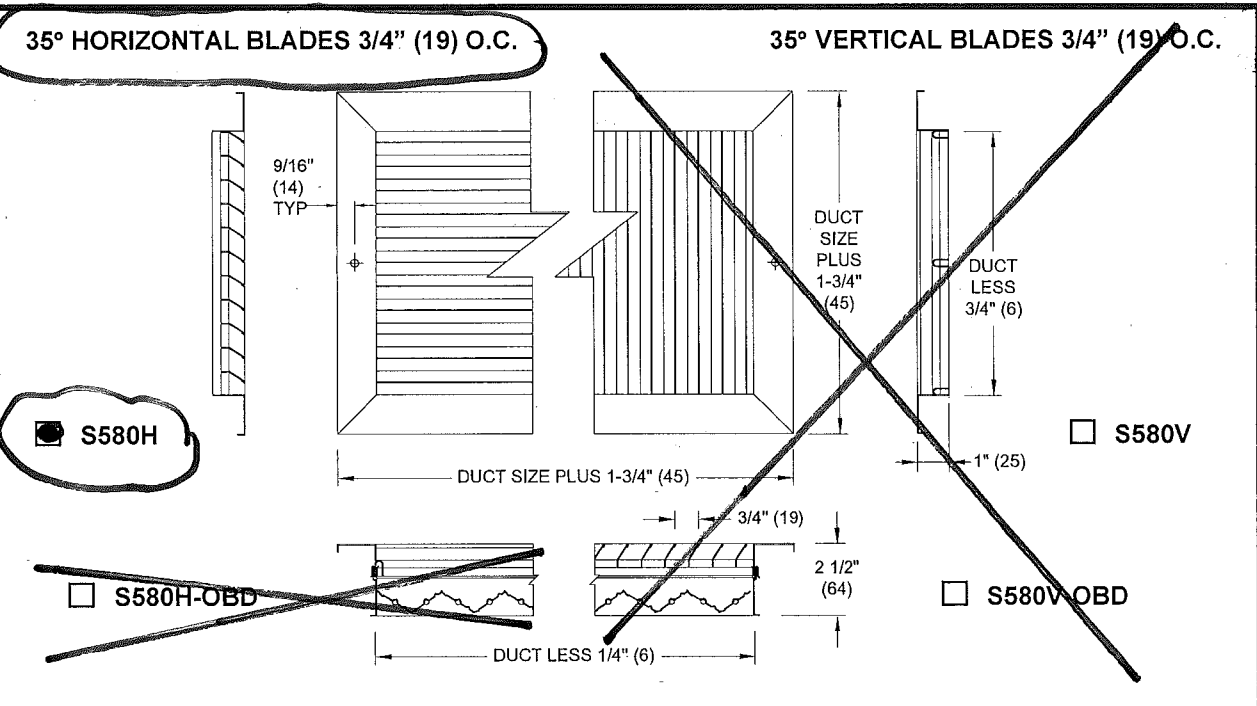


**KRUEGER**  
 Excellence in Air Distribution

## S580H, ~~V or HZ, VZ~~ SERIES

### 3/4" Spaced Fixed Blade Aluminum Return Grille

Page 1 of 2



Product Information is Subject to Change Without Notice

Project: St. Michael The Archangel Catholic Church  
 Location: Woodstock, GA  
 Mech. Cont: Paulson-Cheek Mechanical  
 Mech. Engineer: Leppard Johnson & Associates  
 Submitted by: Georgia Air Associates

TAG: B-Wall

**SUBMITTAL SHEET**  
 Form Number GS209.4 Effective Date 05/13  
 Replaces Form GS0209.3



# S580H, ~~V or HZ~~, VZ SERIES

## Options and Accessories

Page 2 of 2

<b>BASIC FRAME STYLES</b> <p><input checked="" type="checkbox"/> Frame 22 SURFACE MOUNT</p> <p><input type="checkbox"/> Frame 23 LAY-IN T-BAR</p> <p><input type="checkbox"/> Frame 98 NARROW TEE</p>	
<b>BASIC FASTENING METHODS</b> <p><input checked="" type="checkbox"/> NO SCREW HOLES  <input checked="" type="checkbox"/> STANDARD SCREW HOLES  <input type="checkbox"/> CONCEALED FASTENING  <i>Shown to the right</i>  <del>QBD/5OBD not available with concealed mounting</del></p>	
<b>FILTER FRAME OPTION</b> <p>Frame 23 Shown</p> <p>Frame 98 Shown</p> <p>Frame 22 Shown</p> <p><b>KNURLED / HINGE TOP</b>  <input type="checkbox"/> KNURLED / HINGE TOP  <input type="checkbox"/> KNURLED / HINGE BOTTOM  <input type="checkbox"/> KNURLED / HINGE RIGHT  <input type="checkbox"/> KNURLED / HINGE LEFT  <input type="checkbox"/> KNURLED / NO HINGE</p> <p><b>1/4 TURN / HINGE TOP</b>  <input type="checkbox"/> 1/4 TURN / HINGE TOP  <input type="checkbox"/> 1/4 TURN / HINGE BOTTOM  <input type="checkbox"/> 1/4 TURN / HINGE RIGHT  <input type="checkbox"/> 1/4 TURN / HINGE LEFT  <input type="checkbox"/> 1/4 TURN / NO HINGE</p> <p>DIMENSIONS ARE SHOWN AS INCHES (MM)</p> <p>* MAX NOMINAL DUCT SIZE FOR F23 AND F98 IS PANEL MINUS 1/4"</p>	
<b>NOTES :</b> S580H / <del>V or HZ</del> / VZ ARE ALL ALUMINUM CONSTRUCTION. SUPPORT MULLIONS 8" (203) O.C.  DIMENSIONS ARE SHOWN AS INCHES (MM)	<b>OPTIONAL ACCESSORIES :</b> <input type="checkbox"/> OBD (22 GA) STEEL OPPOSED BLADE DAMPER <input type="checkbox"/> POBD (22 GA) STEEL OPPOSED BLADE DAMPER PAINTED FINISH <input type="checkbox"/> 5OBD ALUMINUM OPPOSED BLADE DAMPER <input type="checkbox"/> PLASTER FRAME  <input type="checkbox"/> 1" FILTER FRAME (NOT AVAILABLE WITH OBD) <input type="checkbox"/> 2" FILTER FRAME (NOT AVAILABLE WITH OBD)

TAG: E


**KRUEGER**  
 Excellence in Air Distribution

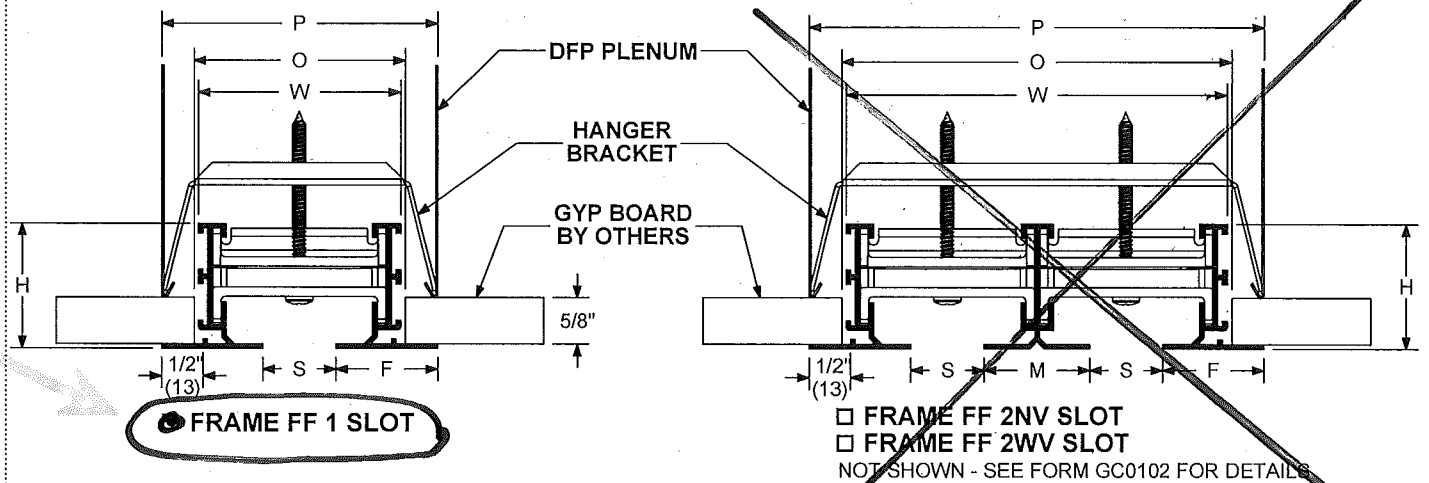
**DESIGNFLO™ / DFP TYPE F**
**DFL FRAME FF WITH CONCEALED MOUNTING OPTIONS**
**SUBMITTAL SHEET**

Project: St. Michael The Archangel Catholic Church

Location: Woodstock, GA

Mech. Cont: Paulson-Cheek Mechanical

Mech. Engineer: Leppard Johnson &amp; Associates

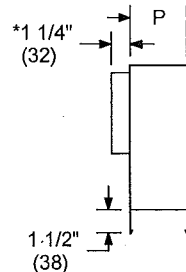
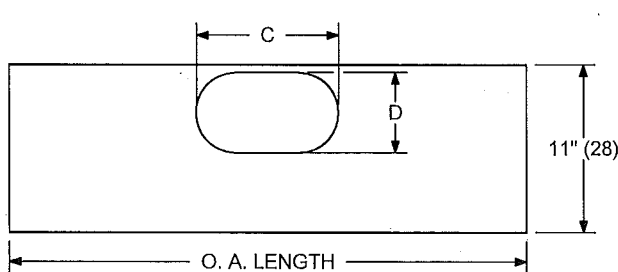

**DFL NOTES :**

- CONSTRUCTION IS EXTRUDED ALUMINUM WITH ENGINEERED POLYMER COMPONENTS
- SEE FORM GS0100 FOR ADDITIONAL DFL 1 SLOT DETAILS
- SEE FORM GS0102 FOR ADDITIONAL DFL 2 SLOT DETAILS.

**OPTIONS :**

- ☒ HT - HORIZONTAL AIR FLOW  
☐ VT - VERTICAL AIR FLOW  
☒ 00 - NO BLADES AS SHOWN

MODEL	SLOT S	FRAME F	HEIGHT H	ONE SLOT			TWO SLOT			
				STACK W	OPENING O	PLENUM P	STACK W	OPENING O	PLENUM P	FRAME M
<input type="checkbox"/> DFL10	1 (25)	1 3/8 (35)	1 11/16 (43)	2 3/4 (70)	3 (76)	3 3/4 (95)	5 3/16 (132)	5 1/2 (140)	6 3/16 (157)	1 7/16 (37)
<input checked="" type="checkbox"/> DFL15	1 1/2 (38)	1 5/8 (41)	1 11/16 (43)	3 3/4 (95)	4 (102)	4 3/4 (121)	7 3/16 (183)	7 1/2 (191)	8 3/16 (208)	1 15/16 (49)
<input type="checkbox"/> DFL20	2 (51)	1 7/8 (48)	1 11/16 (43)	4 3/4 (121)	5 (127)	5 3/4 (146)	9 3/16 (233)	9 1/2 (241)	10 3/16 (258)	2 7/16 (62)
<input type="checkbox"/> DFL25	2 1/2 (64)	2 1/8 (54)	2 5/16 (59)	5 3/4 (146)	6 (152)	6 3/4 (171)	11 1/2 (292)	11 1/2 (292)	12 3/16 (310)	2 15/16 (75)
<input type="checkbox"/> DFL30	3 (76)	2 3/8 (60)	2 5/16 (59)	6 3/4 (171)	7 (178)	7 3/4 (197)	13 3/16 (335)	13 1/2 (343)	14 3/16 (360)	3 7/16 (87)

**DFP PLENUM BOOT**

**OPTIONS:**

- ☒ 1/4" (6), 2LB DENSITY FIBERGLASS INSULATION. END CAPS ARE NOT INSULATED  
☐ \*QUADRANT DAMPER - ADDS 6" (152) TO INLET DEPTH\*

INLET SIZE	C	D
6" OVAL	6 1/4 (159)	5 1/4 (133)
8" OVAL	9 3/8 (238)	5 1/4 (133)
10" OVAL	12 1/2 (318)	5 1/4 (133)
12" OVAL	14 1/8 (359)	7 7/8 (200)

 DIMENSIONS ARE GIVEN  
 AS INCHES (MM)

MODEL	NOMINAL LENGTH	O.A. LENGTH	ONE SLOT	TWO SLOT
			PLENUM WIDTH P	PLENUM WIDTH P
<input type="checkbox"/> DFP 10			3 3/4 (95)	6 3/16 (157)
<input checked="" type="checkbox"/> DFP 15	24 (610)	24 (610)	4 3/4 (121)	8 3/16 (208)
<input type="checkbox"/> DFP 20	36 (914)	36 (914)	5 3/4 (146)	10 3/16 (258)
<input type="checkbox"/> DFP 25	48 (1219)	48 (1219)	6 3/4 (171)	12 3/16 (310)
<input type="checkbox"/> DFP 30	60 (1524)	60 (1524)	7 3/4 (197)	14 3/16 (360)

Revision Date: 5/13

Form: GC0110.4

Replaces: GC0110.3

Product Information is Subject to Change Without Notice

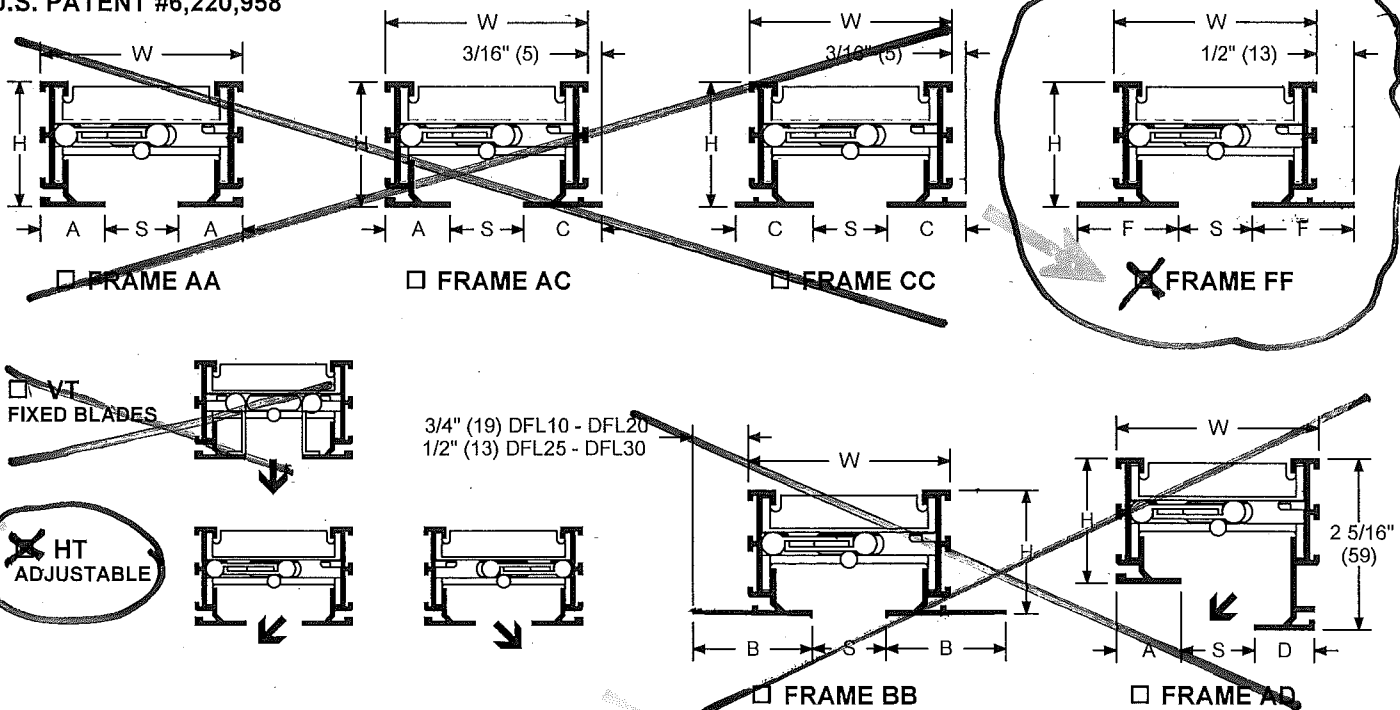


TAG: E

# DESIGNFLO™ HT/VT

## ONE SLOT ALUMINUM ARCHITECTURAL LINEAR CEILING DIFFUSER SUBMITTAL SHEET

U.S. PATENT #6,220,958



### NOTES :

CONSTRUCTION IS EXTRUDED ALUMINUM WITH ENGINEERED POLYMER COMPONENTS

LENGTHS GREATER THAN 144" (3658), OR CURVED LENGTHS GREATER THAN 120" (3048), ARE FURNISHED IN MULTIPLE SECTIONS

PATTERN CONTROLLERS, 24" (610) LONG, CHANGE AIR FLOW DIRECTION AND VOLUME

FRAME AD IS OFFERED IN ONE SLOT ONLY

FRAME AD IS NOT AVAILABLE WITH VT PATTERN CONTROLLER

CROSS SECTIONS SHOWN ARE NOT REPRESENTATIVE OF ALL HEIGHTS (H)

### STANDARD FINISH :

FACE IS #44 WHITE WITH FLAT BLACK INTERIOR  
FRAME BB IS OFFERED ONLY IN #35 BLACK

### OPTIONS :

- ☐ NO PATTERN CONTROLLERS
- ☒ MITERED CORNERS. SEE FORM GC0105
- ☒ PLENUMS. SEE FORM GC0105
- ☒ RETURN HOODS. SEE FORM GC0105
- ☒ BLANK OFFS. SEE FORM GC0105
- ☒ HANGER AND MOUNTING CLIPS. SEE FORM GC0107
- ☒ ADDITIONAL FINISHES AVAILABLE

	SLOT S	FRAME A	FRAME B	FRAME C	FRAME D	FRAME F	STACK W	HEIGHT H
<input type="checkbox"/> DFL10	1 (25)	7/8 (22)	1 5/8 (41)	1 1/16 (27)	7/8 (22)	1 3/8 (35)	2 3/4 (70)	1 11/16 (43)
<input checked="" type="checkbox"/> DFL15	1 1/2 (38)	1 1/8 (29)	1 7/8 (48)	1 5/16 (33)	1 1/8 (29)	1 5/8 (41)	3 3/4 (95)	1 11/16 (43)
<input type="checkbox"/> DFL20	2 (51)	1 3/8 (35)	2 1/8 (54)	1 9/16 (40)	1 3/8 (35)	1 7/8 (48)	4 3/4 (121)	1 11/16 (43)
<input type="checkbox"/> DFL25	2 1/2 (64)	1 5/8 (41)	2 1/8 (54)	1 13/16 (46)	NA	2 1/8 (54)	5 3/4 (146)	2 5/16 (59)
<input type="checkbox"/> DFL30	3 (76)	1 7/8 (48)	2 3/8 (60)	2 1/16 (52)	NA	2 3/8 (60)	6 3/4 (171)	2 5/16 (59)

DIMENSIONS ARE GIVEN AS INCHES (MM)

Revision Date: 08/11

Form: GC0100.8

Replaces: GC0100.7

Product Information is Subject to Change Without Notice

41

**KRUEGER**

Excellence in Air Distribution

TAG: E

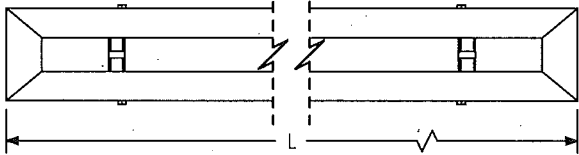
**DESIGNFLO™ CEILING DIFFUSER****ALUMINUM ARCHITECTURAL LINEAR SLOT DIFFUSER****SUBMITTAL SHEET**

Project: St. Michael The Archangel Catholic Church

Location: Woodstock, GA

Mech. Cont: Paulson-Cheek Mechanical

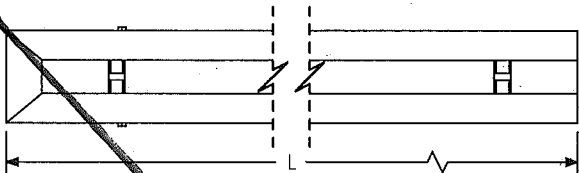
Mech. Engineer: Leppard Johnson &amp; Associates

**END BORDER 01**

MITERED / MITERED

UNIT LENGTH = ORDERED LENGTH (L)

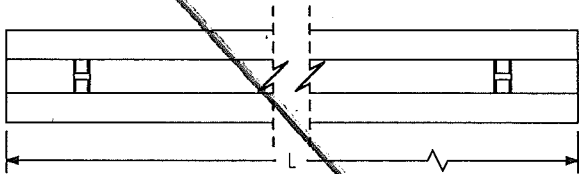
FRAME 'AA' / 'CC' / OR 'FF' 1 SLOT ONLY

**END BORDER 02**

MITERED / BUTT CUT

UNIT LENGTH = ORDERED LENGTH (L)

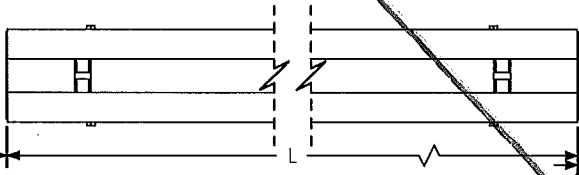
FRAME 'AA' / 'CC' / OR 'FF' 1 SLOT ONLY

**END BORDER 03**

BUTT CUT / BUTT CUT

UNIT LENGTH = ORDERED LENGTH (L)

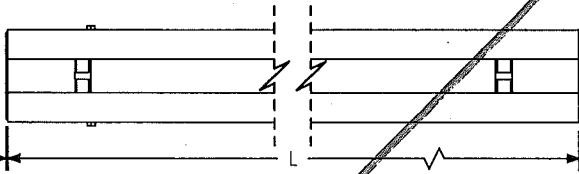
ALL FRAMES AND SLOTS

**END BORDER 04**

END PLATE / END PLATE

UNIT LENGTH = ORDERED LENGTH (L) + 1/8" (3)

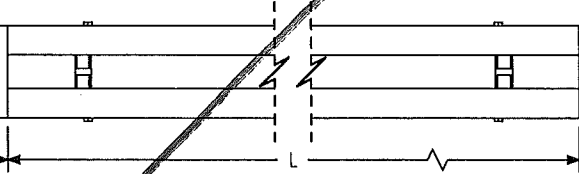
ALL FRAMES AND SLOTS

**END BORDER 05**

END PLATE / BUTT CUT

UNIT LENGTH = ORDERED LENGTH (L) + 1/16" (2)

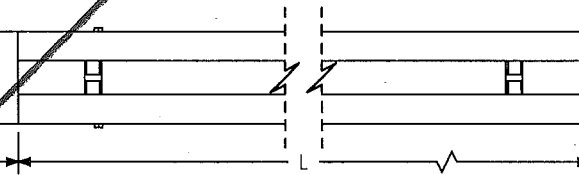
ALL FRAMES AND SLOTS

**END BORDER 06**

END CAP / END CAP

UNIT LENGTH = ORDERED LENGTH (L) + 2 1/8" (54)

ALL SLOTS AND FRAMES, EXCEPT 'AD' / 'DA' / 'BB'

**END BORDER 07**

END CAP / BUTT CUT

UNIT LENGTH = ORDERED LENGTH (L) + 1 1/16" (27)

ALL SLOTS AND FRAMES EXCEPT 'AD' / 'DA' / 'BB'

DIMENSIONS ARE GIVEN AS  
INCHES (MM)

Revision Date: 09/11

Form: GC0101.5

Replaces: GC0101.4

Product Information is Subject to Change Without Notice

42



**KRUEGER**

Excellence in Air Distribution

**TAG: E**  
**Plenums**

# DESIGNFLO™ / DFP TYPE F

## DESIGNFLO PLENUM BOOT WITH CONCEALED MOUNTING SUBMITTAL SHEET

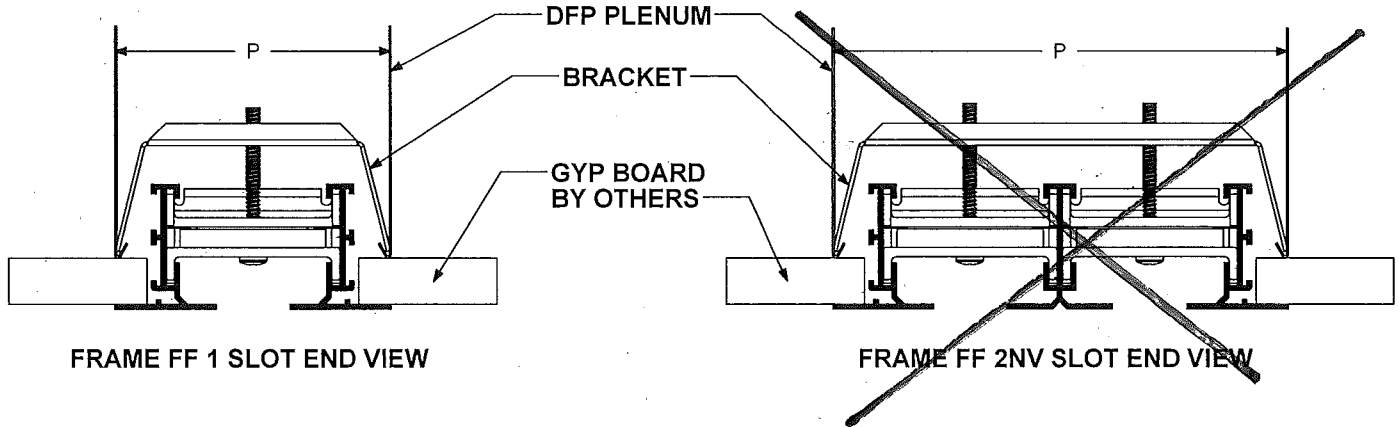
Project: St. Michael The Archangel Catholic Church

Location: Woodstock, GA

Mech. Cont: Paulson-Cheek Mechanical

Mech. Engineer: Leppard Johnson & Associates

U.S. PATENT# 6,220,958

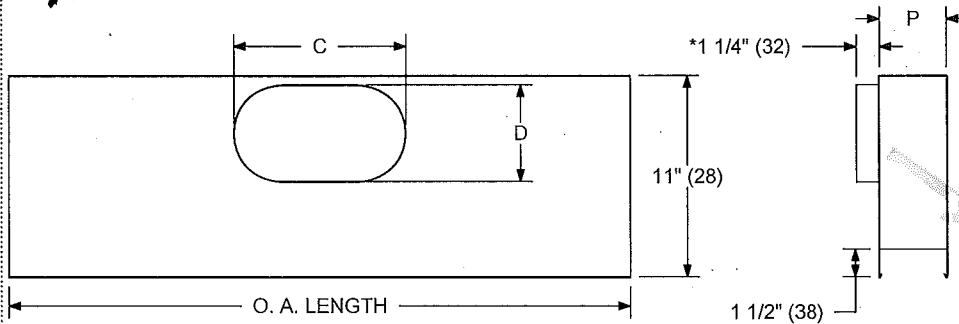


FRAME FF 1 SLOT END VIEW

FRAME FF 2NV SLOT END VIEW

~~DFP PLENUM BOOT~~

DIMENSIONS ARE GIVEN  
AS INCHES (MM)



INLET SIZE	C	D
6" OVAL	6 1/4 (159)	5 1/4 (133)
8" OVAL	9 3/8 (238)	5 1/4 (133)
10" OVAL	12 1/2 (318)	5 1/4 (133)
12" OVAL	14 1/8 (359)	7 7/8 (200)

### OPTIONS:

- ☒ 1/4" (6), 2LB DENSITY FIBERGLASS INSULATION, END CAPS ARE NOT INSULATED
- ☒ \*QUADRANT DAMPER - ADDS 6" (152) TO INLET DEPTH.

MODEL	NOMINAL LENGTH	O.A. LENGTH	ONE SLOT	2NV/2VV	2AB
			PLENUM WIDTH P	PLENUM WIDTH P	PLENUM WIDTH P
<input type="checkbox"/> DFP 10	24 (610)	24 (610)	3 3/4 (95)	6 3/16 (157)	7 1/16 (180)
<input checked="" type="checkbox"/> DFP 15	36 (914)	36 (914)	4 3/4 (121)	8 3/16 (208)	9 1/16 (230)
<input type="checkbox"/> DFP 20	48 (1219)	48 (1219)	5 3/4 (146)	10 3/16 (258)	11 1/16 (281)
<input type="checkbox"/> DFP 25	60 (1524)	60 (1524)	6 3/4 (171)	12 3/16 (310)	13 1/16 (332)
<input type="checkbox"/> DFP 30			7 3/4 (197)	14 3/16 (360)	15 1/16 (383)

Revision Date: 5/13

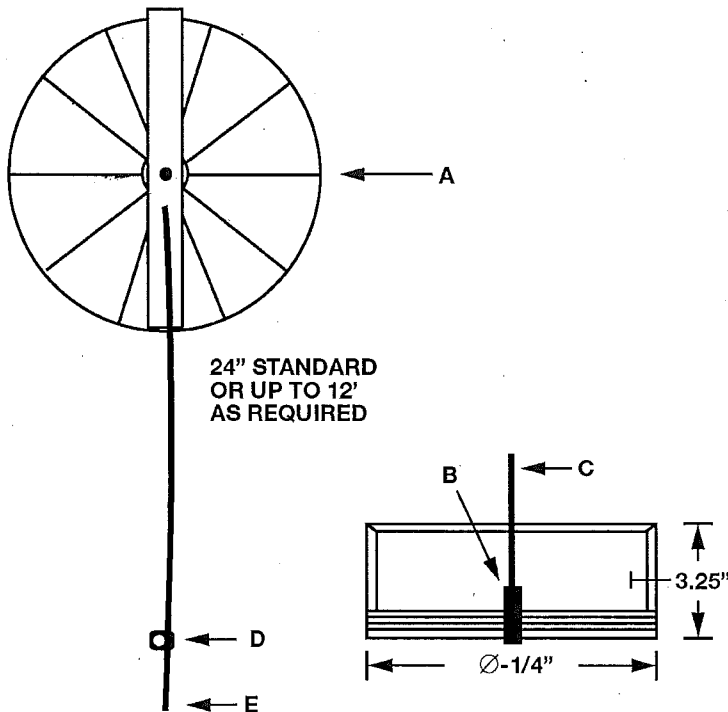
Form: GC0105.11-GC110.7

Replaces: GC0105.10-GC110.6

Product Information is Subject to Change Without Notice

43

## The RT-150 Series III Submittal Data



US PATENT #5,702,298  
CANADIAN PATENT #2,185,311

### Design & Materials

- A. Galvanized steel radial damper velocity loaded to hold setting. Also available in aluminum and stainless steel.
- B. Damper pivot accepts rotary cable.
- C. Cable lengths as required up to 12'. 1/4" brass plated steel rotary cable.
- D. Nylon cable clamp for field furnished with 5/16" hex self-drilling screw.
- E. Male square rotary cable end adjusts with a standard hex nut driver (by others) or the MAT square nut driver. Optional: thin-blade screwdriver adjusted cable tip.

### Features

- Furnished one piece for easy installation.
- Cable minimum turn radius = 4".
- Operating temperature limits = -40° to 240° F.
- Maximum recommended velocity = 1600 FPM.
- No linkages or cable to adjust.
- No small loose parts to get lost.
- Dampers may be installed in any plane.
- See Model RT-100 for square/rectangular damper units.

### Available Sizes

~~63 / 70 / 80 / 100 / 110 / 120 / 140 / 150~~

Location/System	Qty.	Duct Nominal Dia.	Material	Cable Length	Miscellaneous
<i>* see schedule *</i>					

Project: St. Michael The Archangel Catholic Church

Location: Woodstock, GA

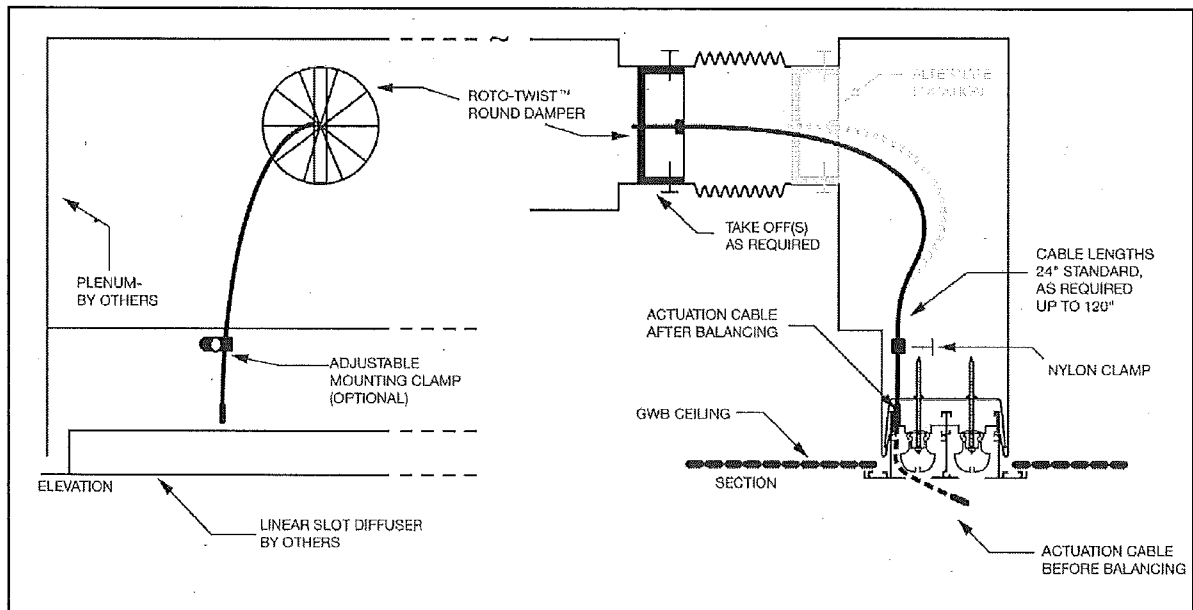
Mech. Cont: Paulson-Cheek Mechanical

Mech. Engineer: Leppard Johnson & Associates

Submitted by: Georgia Air Associates

6235 South Oak Park Avenue Chicago, IL 60638 USA  
Toll free: 800.585.7686 708.552.4040  
Fax: 708.594.0396 www.metairtech.com

## → The RT-150 Series III Specifications



SK-150-2.3 NTS SERIES III

Furnish cable operated remote controlled volume dampers in inaccessible branch ducts feeding continuous linear diffuser plenums and where otherwise indicated. Reference architectural drawings for locations of gypsum board, spline etc. ceilings. Dampers shall be adjustable through the diffuser face with standard tools, providing positive balancing of multiple airflows to maintain design air throw and noise criteria. Galvannealed steel radial damper shall be direct actuated by a brass plated rotary cable which is fixed at the damper end in an integral support bracket. Rotary cable shall have a minimum torque service factor of 200% when installed in accordance with manufacturer furnished instructions. Entire assembly shall be furnished as one piece for installation with no linkage adjustment required or miscellaneous small parts. Each unit shall be factory tested as a complete assembly prior to shipment (100% testing). Accessible cable end shall be secured with a factory furnished nylon clamp, allowing maximum placement flexibility. Positive, direct, two-way damper control shall be provided without sleeves, springs, or screw adjustments (that may loosen after ceiling closure). Cable operated dampers shall be Metropolitan Air Technology LLC. Model #RT-150.

The RT-150 radial damper is also available in aluminum and stainless steel.

US Patent #5,702,298. Canadian Patent #2,185,311

**Project: St. Michael The Archangel Catholic Church**

**Location: Woodstock, GA**

**Mech. Cont: Paulson-Cheek Mechanical**

**Mech. Engineer: Leppard Johnson & Associates**

**Submitted by: Georgia Air Associates**



**APPROVED**



# HVAC Submittal Cover Sheet

**SECTION: 12**  
**PRODUCT: Take-Off Fittings**

Paulson-Cheek Mechanical, Inc.  
6145 Norhtbelt Parkway, Suite F  
Norcross, GA 30071

PHONE: 770-729-0076  
FAX: 770-729-1076

PROJECT: **Saint Michael The Archangel  
Catholic Church**  
LOCATION: **Woodstock, GA**

Paulson-Cheek Mechanical, Inc.

ARCHITECT'S/ENGINEER'S STAMP

**Paulson-Cheek Mechanical, Inc.**

DATE RECEIVED: 06/25/14  
MANUFACTURER: Jer-Air  
SUPPLIER: GAA  
SUBMITTED DATE: 06/25/14

☒ NO ERRORS DETECTED

☐ CORRECT EXCEPTIONS NOTED

THIS APPROVAL OF SHOP DRAWINGS DOES  
NOT RELIEVE THE SUBCONTRACTOR OR VENDOR  
FROM THE REQUIREMENTS OF THE CONTRACT  
DOCUMENTS.

CHECKED BY: Carden Clark  
DATE CHECKED: 06/25/14



## GEORGIA AIR ASSOCIATES

### SUBMITTAL

PRODUCT: FLEXIBLE DUCTWORK, TAKE-OFF FITTINGS  
AND LINE DAMPERS

PAGE: 1 OF 1

MANUFACTURER: ATCO/JER-AIR

FILE: \_\_\_\_\_

SPEC. PARA. NO.: 233330-2.8; MECH. DWGS.

DATE: 6/25/14

PROJECT: ST. MICHAEL THE ARCHANGEL CATHOLIC CHURCH ARCH: SIZEMORE GROUP ARCHITECTS

LOCATION: WOODSTOCK, GA ENGR: LEPPARD JOHNSON & ASSOC.

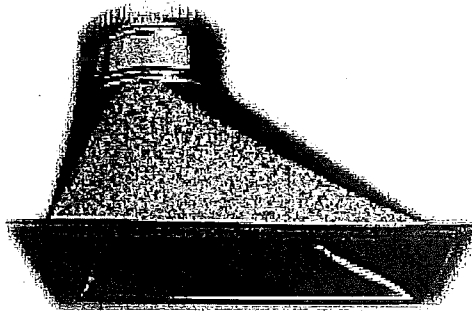
REMARKS: \_\_\_\_\_ CUST: PAULSON-CHEEK MECHANICAL

<u>QTY:</u>	<u>MODEL:</u>	<u>SIZE:</u>	<u>DESCRIPTION:</u>
75'	UPC#036-R6.0-06	6"	FLEXIBLE DUCTWORK
75'	UPC#036-R6.0-08	8"	FLEXIBLE DUCTWORK
175'	UPC#036-R6.0-10	10"	FLEXIBLE DUCTWORK
200'	UPC#036-R6.0-12	12"	FLEXIBLE DUCTWORK
1	AT-501-10	10"	45 DEGREE FITTINGS W/ DAMPER (SUPPLY)
29	AT-501-12	12"	45 DEGREE FITTINGS W/ DAMPER (SUPPLY)
1	AT-501-14	14"	45 DEGREE FITTINGS W/ DAMPER (SUPPLY)
6	RATDS-06	6"	SADDLE FITTINGS W/ SCOOP & DAMPER (SUPPLY)
9	RATDS-08	8"	SADDLE FITTINGS W/ SCOOP & DAMPER (SUPPLY)
23	RATDS-10	10"	SADDLE FITTINGS W/ SCOOP & DAMPER (SUPPLY)
24	RATDS-12	12"	SADDLE FITTINGS W/ SCOOP & DAMPER (SUPPLY)
4	DS-06	6"	LINE DAMPERS (SUPPLY)
2	DS-08	8"	LINE DAMPERS (SUPPLY)
5	DS-10	10"	LINE DAMPERS (SUPPLY)
1	DS-12	12"	LINE DAMPERS (SUPPLY)
3	DS-14	14"	LINE DAMPERS (RETURN)

#### Notes:

- 1) Flexible duct is based on 5' per runout to supply diffusers, except 'E' slot diffusers which have 3' of flexible duct maximum per Detail 1/M601. No flexible duct provided at returns.

# AIR TIGHT 45° TAKE-OFF



Jer-Air's Air Tight 45° Take-Off Fittings are constructed of Galvanized Sheet Steel of lock-forming and roll-forming quality. The 1" wide Mounting flanges come complete with die formed corner clips for added rigidity and pre-punched screw holes. A peel off adhesive coated gasket is provided by the Factory to hold the fitting securely in place during installation and to assure minimal leakage.

~~AT-500~~

~~45° Take-off  
w/gasket~~

AT-501

45° Take-off  
w/gasket and damper

~~AT-502~~

~~45° Take-off  
w/gasket, damper  
& 2" standoff quadrant~~

## Round Diameter      Rectangular Diameter

4"	8" x 6"
5"	10" x 5"
6"	12" x 6"
7"	12" x 6"
8"	12" x 6"
9"	15" x 6"
10"	16" x 6.5"
12"	18" x 8.5"
14"	20" x 9.5"
16"	24" x 12"
18"	26" x 14"

Project: St. Michael The Archangel Catholic  
Church

Location: Woodstock, GA

Mech. Cont: Paulson-Cheek Mechanical

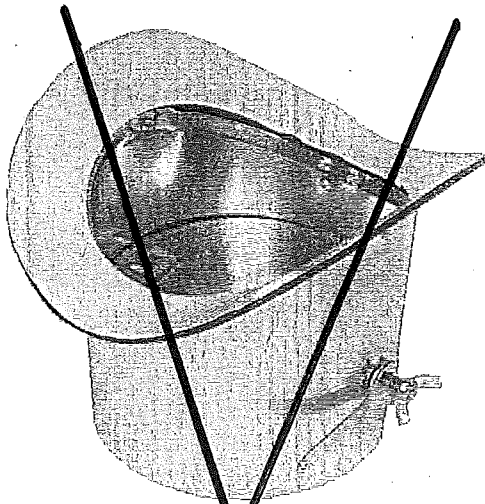
Mech. Engineer: Leppard Johnson & Associates

Submitted by: Georgia Air Associates

\* Sizes 4" thru 9" - 28 gage galvanized sheet steel

\* Sizes 10" thru 20" - 26 gage galvanized sheet steel

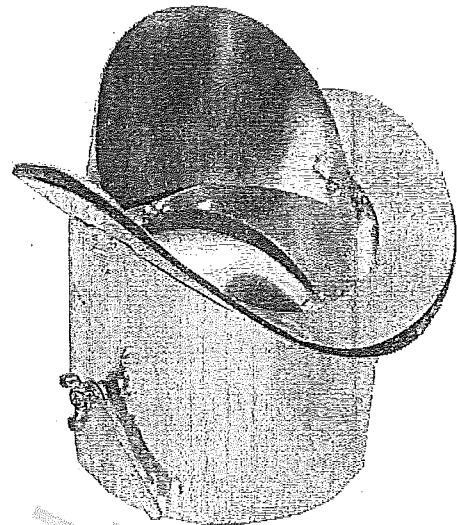
# SHEET METAL FITTINGS



**RAID**  
Round Airtight Stick Ons  
for Round Pipe with Damper

## AVAILABLE SIZES

6"  
8"  
10"  
12"  
14"



**RATDS**  
Round Airtight Stick Ons  
for Round Pipe with Scoop & Damper

## AVAILABLE SIZES

6"  
8"  
10"  
12"

Project: St. Michael The Archangel Catholic  
Church

Location: Woodstock, GA

Mech. Cont: Paulson-Cheek Mechanical

Mech. Engineer: Leppard Johnson & Associates

Submitted by: Georgia Air Associates

\*\*\*\*\*

# Jer-Air Manufacturing, Inc.

P.O. BOX 656 • MCINTOSH, FL 32665 • PHONE 1-(904)-591-2674  
JERRY PHILMAN FAX NO. 1-(904)-591-3241

(5-1-2010)



GEORGIA AIR ASSOCIATES



**APPROVED**

# HVAC Submittal Cover Sheet

**SECTION: 13**  
**PRODUCT: Flexible Ductwork**

Paulson-Cheek Mechanical, Inc.  
6145 Norhtbelt Parkway, Suite F  
Norcross, GA 30071

PHONE: 770-729-0076  
FAX: 770-729-1076

PROJECT: **Saint Michael The Archangel  
Catholic Church**  
LOCATION: **Woodstock, GA**

Paulson-Cheek Mechanical, Inc.

ARCHITECT'S/ENGINEER'S STAMP

## Paulson-Cheek Mechanical, Inc.

DATE RECEIVED: 06/25/14  
MANUFACTURER: Atco  
SUPPLIER: GAA  
SUBMITTED DATE: 06/25/14

☒ NO ERRORS DETECTED

☐ CORRECT EXCEPTIONS NOTED

THIS APPROVAL OF SHOP DRAWINGS DOES  
NOT RELIEVE THE SUBCONTRACTOR OR VENDOR  
FROM THE REQUIREMENTS OF THE CONTRACT  
DOCUMENTS.

CHECKED BY: Carden Clark  
DATE CHECKED: 06/25/14



## GEORGIA AIR ASSOCIATES

### SUBMITTAL

PRODUCT: FLEXIBLE DUCTWORK, TAKE-OFF FITTINGS  
AND LINE DAMPERS

PAGE: 1 OF 1

MANUFACTURER: ATCO/JER-AIR

FILE: \_\_\_\_\_

SPEC. PARA. NO.: 233330-2.8; MECH. DWGS.

DATE: 6/25/14

PROJECT: ST. MICHAEL THE ARCHANGEL CATHOLIC CHURCH ARCH: SIZEMORE GROUP ARCHITECTS

LOCATION: WOODSTOCK, GA ENGR: LEPPARD JOHNSON & ASSOC.

REMARKS: \_\_\_\_\_ CUST: PAULSON-CHEEK MECHANICAL

<u>QTY:</u>	<u>MODEL:</u>	<u>SIZE:</u>	<u>DESCRIPTION:</u>
75'	UPC#036-R6.0-06	6"	FLEXIBLE DUCTWORK
75'	UPC#036-R6.0-08	8"	FLEXIBLE DUCTWORK
175'	UPC#036-R6.0-10	10"	FLEXIBLE DUCTWORK
200'	UPC#036-R6.0-12	12"	FLEXIBLE DUCTWORK
1	AT-501-10	10"	45 DEGREE FITTINGS W/ DAMPER (SUPPLY)
29	AT-501-12	12"	45 DEGREE FITTINGS W/ DAMPER (SUPPLY)
1	AT-501-14	14"	45 DEGREE FITTINGS W/ DAMPER (SUPPLY)
6	RATDS-06	6"	SADDLE FITTINGS W/ SCOOP & DAMPER (SUPPLY)
9	RATDS-08	8"	SADDLE FITTINGS W/ SCOOP & DAMPER (SUPPLY)
23	RATDS-10	10"	SADDLE FITTINGS W/ SCOOP & DAMPER (SUPPLY)
24	RATDS-12	12"	SADDLE FITTINGS W/ SCOOP & DAMPER (SUPPLY)
4	DS-06	6"	LINE DAMPERS (SUPPLY)
2	DS-08	8"	LINE DAMPERS (SUPPLY)
5	DS-10	10"	LINE DAMPERS (SUPPLY)
1	DS-12	12"	LINE DAMPERS (SUPPLY)
3	DS-14	14"	LINE DAMPERS (RETURN)

#### Notes:

- 1) Flexible duct is based on 5' per runout to supply diffusers, except 'E' slot diffusers which have 3' of flexible duct maximum per Detail 1/M601. No flexible duct provided at returns.



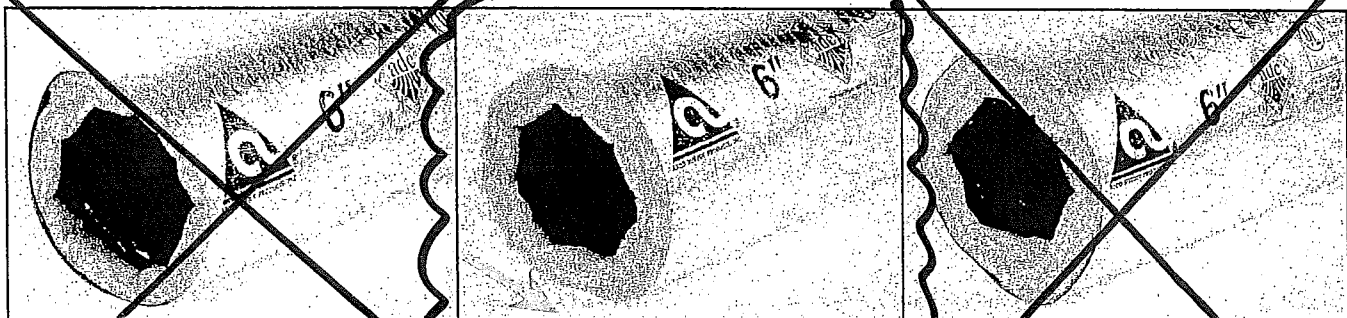
Atco. Working Together.  
Doing It Right.



Thermal Performance

# Flexible Duct Systems

25' Insulated  
UL 181  
Class 1 Air Duct



**UPC #030**  
**R-Value 4.2**

**UPC #036**  
**R-Value 6.0**

**UPC #031**  
**R-Value 8.0**

All thermal performance (R-Values) are classified by Underwriters Laboratories in accordance with ADC Flexible Duct Performance and Installation Standard (1991) using ASTM C-518 (1991), at installed wall thickness, on flat insulation only.

## Description

ATCO #030, 036, and 031 are UL 181, Class 1 Air Ducts and are manufactured with a tri-directional fiberglass scrim reinforced, metallized polyester outer jacket. The inner core of all three products is air-tight and designed for low-to-medium operating pressures in HVAC systems. ATCO #036 and 031 have increased insulation for superior thermal performance.

## Construction

A double lamination of tough polyester which encapsulates a steel wire helix forms the air-tight inner core of the ATCO #030, 036, and 031. The double-layer core of each product is wrapped in multiple thicknesses of fiberglass insulation. All three products are sheathed in a rugged and durable tri-directionally reinforced, metallized polyester jacket.



## FEATURES & BENEFITS



- Air-tight Inner Core** - Energy efficient / No fiberglass erosion into air stream.
- Encapsulated Wire Helix** - No unraveling when cut to length / Quick installation
- Smooth Inner Core** - Low friction loss / Low operating cost.
- Thick Blanket of Fiberglass Insulation** - Energy efficient / Excellent thermal characteristics
- Tough Reinforced Metallized Polyester Jacket** - Tear and puncture resistant / Low maintenance.
- Lightweight Compact Carton** - Reduces warehouse and Jobsite handling cost.



## APPLICATIONS & CODE COMPLIANCES\*

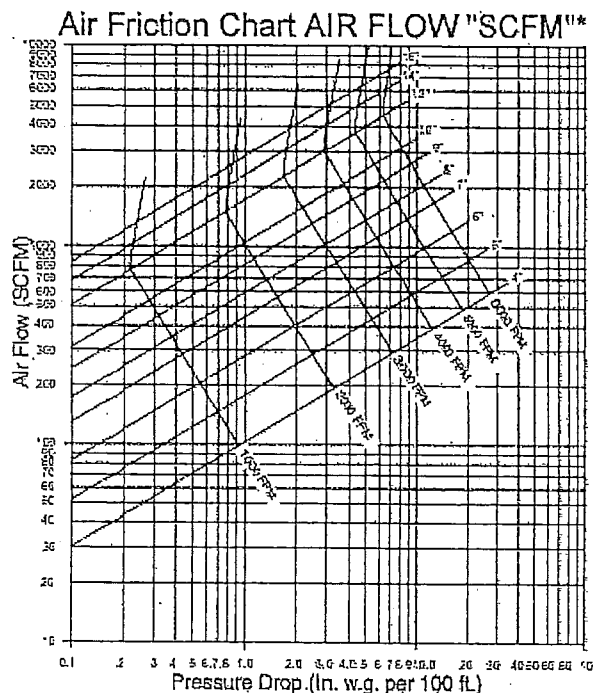


ATCO #030, 036, and 031 are designed for indoor use as a supply and return air duct in residential and commercial low-to-medium pressure heating and air conditioning systems. All three models can be used as a complete air duct system and/or a branch duct connecting to mixing boxes, diffusers, light troffers, room inlets, or other terminal devices. UL 181, NFPA 90A & 90B, IMC, IRC, UMC 10-1, HUD 515-2.1 (b), Cities of Chicago, New York, San Francisco, County of Dade (Florida), California State Fire Marshal.\*

\*ATCO recommends that you check with the local code body having jurisdiction in your area to determine applicable codes.



# PRODUCT & PERFORMANCE DATA



## PRODUCT DATA

- Length: 25', 50' (Other lengths available as special order)
- Diameter: 3", 4", 5", 6", 7", 8", 9", 10", 12", 14", 16", 18", 20", 22"
- Vapor Barrier: Tri-directional, scrim reinforced metallized polyester
- End Treatment: 25', 50' -plain ends
- Packaging: 1 piece per carton

## INSTALLATION

Air duct connections and joints shall be made per installation instructions outlined by ATCO Rubber Products, Inc. and as required by the UL 181 listing procedure.

(Installation instructions are included inside each carton.)

## STRAIGHT RUN

\* FD 72-R1 Test Code of the Air Diffusion Council. Friction loss is computed in inches of water gauge per 100 ft. of duct. By using CFM or FPM values for a given duct dimension, the friction loss can be determined. Conversion of CFM to FPM also can be made.



## PERFORMANCE DATA



**UPC #030**  
**R-Value 4.2**

**UPC #036**  
**R-Value 6.0**

**UPC #031**  
**R-Value 8.0**

- Rated Positive Pressure: 10" w.g. per UL-181 (UL Listed pressure) ratings are determined in straight lengths @ ambient temperatures.)
- Recommended Operating Pressures: (Determined in a 90° bend at elevated temperatures in accordance with ADC FD 72-R1 Test Code.)
  - Maximum Positive:
    - 6" w.g. - 4" thru 12" Dia.
    - 4" w.g. - 14" thru 20" Dia.
  - (With factory installed metal collars, 2" w.g. - all diameters)
  - Maximum Negative: 3/4" w.g. - all diameters
  - Maximum Velocity: 5,000 FPM

- Vapor Transmission: .05 perms
- Maximum Operating Temperatures:
  - 20°F to 140°F Continuous (@ maximum pressure)
  - 20°F to 180°F Continuous (@ 2" pos. w.g. max.)
  - 20°F to 250°F Intermittent (@ 1/2" pos. w.g. max.)
- Flame Spread: 25 max
- Smoke Developed: 50 max



**Warranty** - ATCO warrants that all flexible ducts will be free from defects in material and workmanship for a period of five years from the date of purchase only if the ducts are installed in accordance with ATCO's installation instructions and under conditions specified in ATCO's performance data. The buyer's exclusive remedies for any defect in the flexible ducts shall be replacement or refund of the purchase price, at ATCO's option. ATCO MAKES NO OTHER WARRANTIES, EXPRESS, IMPLIED, STATUTORY OR OTHERWISE. IN PARTICULAR, ATCO MAKES NO WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. ATCO SHALL HAVE NO LIABILITY TO THE BUYER OR ANY THIRD PARTY FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES OF ANY KIND WHATSOEVER, INCLUDING, BUT NOT LIMITED TO, PERSONAL INJURY, PROPERTY DAMAGE, LOST PROFITS OR OTHER ECONOMIC INJURY DUE TO ANY DEFECT IN THE FLEXIBLE DUCTS. MATERIALS AND SPECIFICATIONS FOR THE FLEXIBLE DUCTS ARE SUBJECT TO CHANGE WITHOUT NOTICE.

## Manufacturing & Shipping Locations



Albuquerque, NM • Baltimore, MD • Cartersville, GA • Fort Worth, TX  
Greensboro, NC • Houston, TX • Indianapolis, IN • Phoenix, AZ  
Plainville, GA • Plant City, FL • Riverside, CA • Wiggins, MS  
Sacramento, CA • Springdale, AR • Vineland, NJ

## ATCO RUBBER PRODUCTS, INC.

CORPORATE HEADQUARTERS  
7101 ATCO DRIVE  
FORT WORTH, TEXAS 76118-7098  
PHONE: (817) 595-2894  
1-800-USS-DUCT (1-800-877-3828)  
FAX: 1-800-366-3539 TELEX: 758-510  
[www.atcoflex.com](http://www.atcoflex.com)





# HVAC Submittal Cover Sheet

**SECTION: 14**  
**PRODUCT: Controls**

Paulson-Cheek Mechanical, Inc.  
6145 Norhtbelt Parkway, Suite F  
Norcross, GA 30071

PHONE: 770-729-0076  
FAX: 770-729-1076

PROJECT: **Saint Michael The Archangel  
Catholic Church**  
LOCATION: **Woodstock, GA**

Paulson-Cheek Mechanical, Inc.

ARCHITECT'S/ENGINEER'S STAMP

**Paulson-Cheek Mechanical, Inc.**

DATE RECEIVED: 09/03/14  
MANUFACTURER: Johnson Controls  
SUPPLIER: UGBS  
SUBMITTED DATE: 09/03/14

☒ NO ERRORS DETECTED

☐ CORRECT EXCEPTIONS NOTED

THIS APPROVAL OF SHOP DRAWINGS DOES  
NOT RELIEVE THE SUBCONTRACTOR OR VENDOR  
FROM THE REQUIREMENTS OF THE CONTRACT  
DOCUMENTS.

CHECKED BY: Carden Clark  
DATE CHECKED: 09/03/14



# TEC Series Wireless Thermostat Controller System for Staged Equipment

## Product Bulletin

TEC2001-3, TEC2002-3,  
TEC2003-3, TEC2004-3

Code No. LIT-12011400

Issued June 4, 2009

Supersedes March 25, 2009

The TEC Series Wireless Thermostat Controller System provides wireless networked control of Heating, Ventilating, and Air Conditioning (HVAC) equipment on a Building Automation System (BAS) that enables remote monitoring and programming. This TEC Series System integrates into a supervisory controller using BACnet® Internet Protocol (IP) or BACnet Master-Slave/Token-Passing (MS/TP) communications.

TEC20 Coordinators allow the supervisory controller to communicate with multiple TEC Wireless Thermostat Controllers. TEC200x-3 Series Wireless Thermostat Controllers provide networked control of a variety of staged equipment:

- TEC2001-3 Single-Stage Wireless Thermostat Controllers control fan coil units, unit heaters, and single-stage packaged heating/cooling equipment
- TEC2002-3 Heat Pump Wireless Thermostat Controllers control heat pumps with up to three heating and two cooling stages
- TEC2003-3 Multi-Stage Wireless Thermostat Controllers control multi-stage packaged heating/cooling equipment



**Figure 1: TEC Wireless Thermostat Controller and TEC20 Coordinator with Direct-Mount Antenna and Remote Mount Antenna**

- TEC2004-3 Multi-Stage Economizer Wireless Thermostat Controllers control economizer operation for single- and multi-stage unitary rooftop equipment

The wireless mesh network uses ZigBee™ technology to enable remote monitoring and programming and to enhance reliability by providing redundant transmission paths through other TEC Wireless Thermostat Controllers, creating a resilient, self-healing mesh network.

**Table 1: Features and Benefits**

Features	Benefits
<b>Wireless Communication</b>	Allows BAS communications capability in applications where field bus wiring within the building is prohibitive.
<b>Integral Wireless Signal Strength Testing Built into Wireless Thermostat Controllers and Coordinators</b>	Provides quick, easy, visual indication of the wireless Radio Frequency (RF) signal strength between a sensor and associated receiver; helps locate optimum device positions during installation; and aids troubleshooting your applications.
<b>Backlit Liquid Crystal Display (LCD)</b>	Offers real-time control status of the environment in easy-to-read, English text messages with constant backlight that brightens during user interaction.
<b>Two Configurable Binary Inputs on Many Models</b>	Provide additional inputs for advanced functions such as remote night setback, service or filter alarms, or occupancy override.
<b>Over 20 Configurable Parameters</b>	Enable the TEC Wireless Thermostat Controller to adapt to any application, allowing installer parameter access without opening the cover.
<b>Economizer Output (TEC2004-3 Model)</b>	Provides control of economizer operation for single- and multi-stage unitary rooftop equipment.

## Applications

**IMPORTANT:** Use the TEC Series Wireless Thermostat Controller System only to provide an input to equipment under normal operating conditions. Where failure or malfunction of the thermostat controller could lead to personal injury or property damage to the controlled equipment or other property, additional precautions must be designed into the control system. Incorporate and maintain other devices, such as supervisory or alarm systems or safety or limit controls, intended to warn of or protect against failure or malfunction of the TEC Series Wireless Thermostat Controller System.

The TEC Series Wireless Thermostat Controller System is ideal for any location where it is cost-prohibitive, difficult, or aesthetically unappealing to hard wire between BACnet devices, including supervisory controllers (such as NAE35/45/55 or NCE25 engines) and thermostat controllers. Examples of these locations include the following:

- commercial structures with brick or solid concrete walls and/or ceilings that impede hard-wired TEC Series Thermostat Controller applications
- office buildings, retail stores, and other commercial real estate where tenant turnover is frequent
- museums, historical buildings, atriums, and other sites where building aesthetics and historical preservation are important
- buildings with marble, granite, glass, mirrored, wood veneer, or other decorative surfaces that present challenges to hard-wired applications
- buildings with asbestos or other hazardous materials that must not be penetrated or disturbed
- buildings with occupants sensitive to disruptions to business

Locations or applications that prohibit cellular telephones or Wireless Fidelity (WiFi) systems are unsuitable for the TEC Series Wireless Thermostat Controller System:

- operating rooms or radiation therapy rooms
- validated environments
- UL 864 applications

## Wireless Communication

The TEC Series Wireless Thermostat Controller System uses Direct-Sequence, Spread-Spectrum (DSSS) Radio Frequency (RF) technology and operate on the 2.4 GHz Industrial, Scientific, and Medical (ISM) band. The system meets the IEEE 802.15.4 standard for low power, low duty-cycle RF transmitting systems, and is compatible with wireless mesh networks compliant with the ZigBee standard. The TEC Series Wireless Thermostat Controller System uses a transmission power of 10 dBm.

For more information on wireless communication in the TEC Wireless Thermostat Controller System, refer to the *TEC Series Wireless Thermostat Controller System Technical Bulletin (LIT-12011414)*.

### Wireless Signal Transmission Range

Line-of-sight transmission ranges between a TEC20 Coordinator and a TEC Wireless Thermostat Controller (or between TEC Wireless Thermostat Controllers) can be less than the recommended distances shown in Table 2. The effective transmission range for indoor applications varies because of RF signal absorption and reflection due to metal obstructions, walls (or floors), and furniture found in typical building interiors.

**Table 2: Recommended Transmission Ranges**

Type	Distance
Through Walls	10 m (30 ft)
Open Space	30 m (100 ft)

For detailed information on locating devices for optimum signal strength, refer to the *Wireless Metasys System Location Guide (LIT-12011294)*.

### Wireless RF Interference and Security

The TEC Series Wireless Thermostat Controller System is designed to virtually eliminate RF interference with other wireless applications. In most commercial environments, the TEC Series Wireless Thermostat Controller System does not encounter or generate RF interference, even in environments with cell phones and competing WiFi applications. Wireless RF transmissions using ZigBee technology use modulation schemes different from WiFi applications and use frequencies between popular WiFi bands, enabling these networks to exist in the same areas.

While using industry-standard frequencies, the devices use a proprietary protocol that secures the RF data transmissions and inhibits the deciphering of any intercepted RF data.

For more information on RF interference and wireless security, refer to the following documents:

- *TEC Series Wireless Thermostat Controller System Technical Bulletin (LIT-12011414)*
- *Wireless Metasys System Location Guide (LIT-12011294)*

## System Overview

A TEC Series Wireless Thermostat Controller System consists of:

- a supervisory controller
- at least one TEC20 Coordinator and 15 VDC power supply (available separately)
- multiple TEC Wireless Thermostat Controllers

A TEC20 Coordinator enables the TEC Wireless Thermostat Controllers to communicate with the supervisory controller, which schedules occupancy, collects trend data, overrides points, and monitors alarms. The TEC Series Wireless Thermostat Controller System confirms and synchronizes data transmissions between the TEC Wireless Thermostat Controllers and TEC20 Coordinators.

Figure 2 illustrates a simple TEC Series Wireless Thermostat Controller System using BACnet MS/TP or BACnet IP communication protocol.

For information on commissioning and configuring a TEC Series Wireless Thermostat Controller System for operation, refer to the *TEC Series Wireless Thermostat Controller System Technical Bulletin (LIT-12011414)*.

## Component Quantities

A TEC Series Wireless Thermostat Controller System can support up to:

- 100 TEC Wireless Thermostat Controllers per MS/TP trunk on the supervisory controller
- 254 TEC Wireless Thermostat Controllers integrated through BACnet IP on a supervisory controller
- 30 TEC Wireless Thermostat Controllers per TEC20 Coordinator

Each increment of 30 TEC Wireless Thermostat Controllers requires one additional TEC20 Coordinator. See Table 3 for component quantities.

**Table 3: TEC Wireless System Component Quantities**

Number of TEC Wireless Thermostat Controllers	TEC20 Coordinators Required
1-30	1
31-60	2
61-90	3
91-100	4

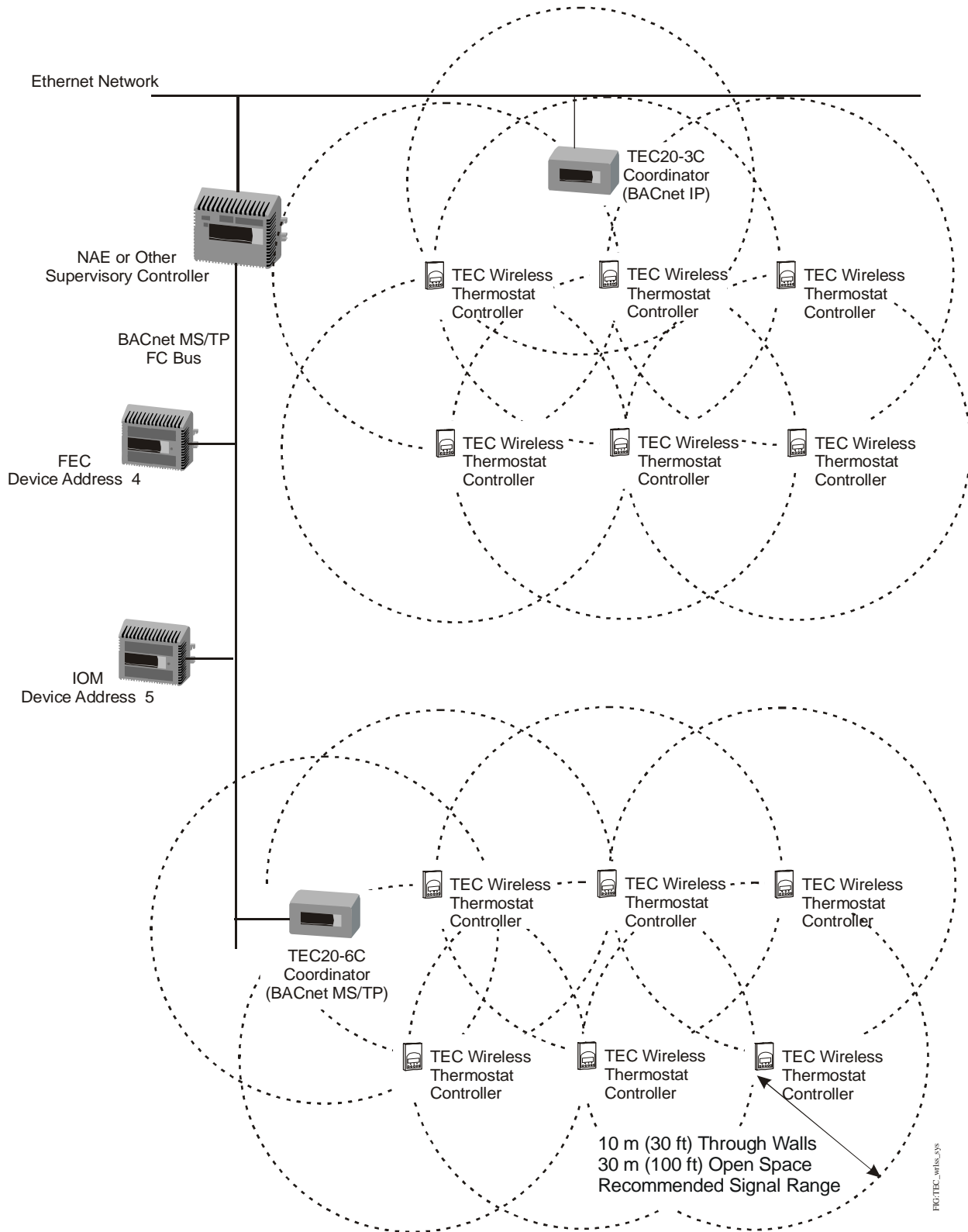
TEC Wireless Thermostat Controllers can be added as repeaters, as required, to extend range and provide redundant pathways. TEC Wireless Thermostat Controllers serving only as repeaters do not count towards the totals shown in Table 3; however, indiscriminate use of TEC Wireless Thermostat Controllers as repeaters can lead to reduced performance.

## BACnet MS/TP Limitations

TEC20 Coordinators each count as a single device in the BACnet MS/TP trunk limitations. TEC Wireless Thermostat Controllers do not count toward device limitations; however, they do count towards number of points limitations on a supervisory controller.

## BACnet IP Limitations

Parameters on TEC Wireless Thermostat Controllers that are integrated into the supervisory controller as points count towards limitations of number of points per supervisory controller.



**Figure 2: TEC Series Wireless Thermostat Controller System**



## Component Descriptions

### Supervisory Controllers

The TEC Series Wireless Thermostat Controller System uses Web-enabled, Ethernet-based, supervisory controllers that connect BAS networks to IP networks and the Web. These supervisory controllers provide scheduling, alarm and event management, trending, energy management, data exchange, dial-out capability, and password protection. With a computer running Microsoft® Internet Explorer® Web browser version 6.0 (or later), you can browse to a configured supervisory controller, and monitor and control BAS field devices in the User Interface (UI).

Refer to the *TEC Series Wireless Thermostat Controller System Technical Bulletin (LIT-12011414)* for information on configuring a TEC Series Wireless Thermostat Controller System.

### TEC20 Coordinators

A TEC20 Coordinator provides a wireless interface between a supervisory controller and the TEC Wireless Thermostat Controllers, allowing the exchange BACnet IP (TEC20-3C) or BACnet MS/TP (TEC20-6C) messages.

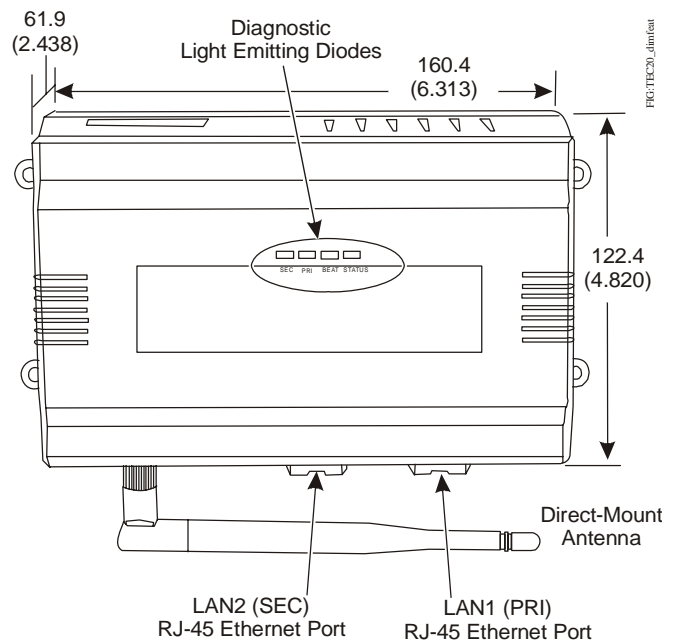
The TEC20 Coordinator initiates the formation of the wireless mesh network – one is required per wireless mesh network. Each TEC20 Coordinator and the TEC Wireless Thermostat Controllers assigned to it share a Personal Area Network Identification (PAN ID).

A TEC20 Coordinator requires a 15 VDC power source (available separately). An optional remote-mount antenna and cable is available to allow transmission when the TEC20 Coordinator is mounted inside a metal panel.

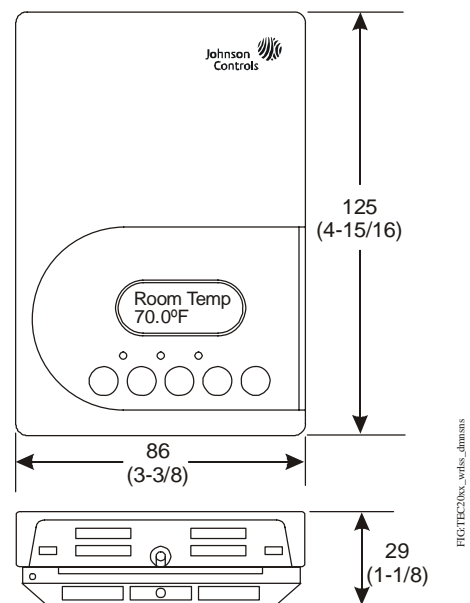
### TEC Wireless Thermostat Controllers

Depending on the model, the TEC Wireless Thermostat Controllers can communicate sensed temperature, setpoint temperature, and other data with an associated supervisory controller. Using this information, the TEC Wireless Thermostat Controllers control rooftop units (with or without economizers), heat pumps, and single- and multi-stage heating/cooling equipment. See [Applications](#) for more information. The TEC Wireless Thermostat Controllers are designed for indoor, intra-building applications only.

The TEC Wireless Thermostat Controllers can also serve as repeaters to extend the range of the communications within the wireless mesh network.



**Figure 3: TEC20 Wireless Coordinator, Physical Features and Dimensions, mm (in.)**

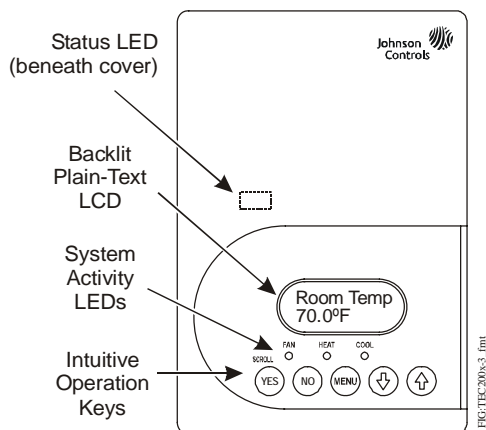


**Figure 4: TEC Wireless Thermostat Controller Dimensions, mm (in.)**

See the following list for features common to TEC Wireless Thermostat Controllers for staged equipment control:

- **Adjustable Heating/Cooling Deadband**  
Adjusts the minimum heating/cooling deadband from 2.0F°/1.0C° to 5.0F°/2.5C°.
- **Easy-to-Use Interface Keys**  
Allow for easy commissioning of the thermostat, and eliminate the need for DIP switches.
- **Levels of Keypad Lockout**  
Provide levels of keypad lockout that can be set up through the Installer Configuration Menu.
- **Accessible Configuration Parameters**  
Allow local access to all configurable parameters while limiting unwanted parameter tampering once the thermostat is set up.
- **Light-Emitting Diodes (LEDs)**  
Provide status at a glance.
- **Adjustable Temporary Occupancy Time**  
Adjusts the temporary occupancy time from 0 to 12 hours.
- **Auxiliary Contact**  
Provides 24 VAC control for reheat, lighting, and other auxiliary functions.
- **Nonvolatile Electrically Erasable Programmable Read-Only Memory (EEPROM)**  
Prevents loss of adjusted parameters during a power failure.
- **Remote Access**  
Allows the user to read/write and access the parameters of the thermostat via a supervisory controller.
- **Remote Indoor Sensing**  
Accommodates remote indoor sensors. Up to three indoor sensors can be averaged.
- **Adjustable Heating/Cooling Cycles per Hour (On/Off Control)**  
Allow configuration for 3 to 8 heating cycles and 3 or 4 cooling cycles in a 1-hour period, balancing temperature control and equipment cycling.
- **Adjustable Anti-Short Cycle Timer**  
Adjusts the minimum on/off times for heating and cooling stages from 0 to 5 minutes.
- **Frost Protection**  
Provides a minimum heating setpoint of 42.0°F/5.5°C to prevent freezing in the zone controlled by the thermostat, regardless of its mode.
- **Remote Outdoor Sensing**  
Accommodates remote outdoor sensors.
- **High and Low Balance Point Adjustments (TEC2002-3 Model)**  
Allows more precise control of heat pump operation based on the outdoor air temperature.
- **System Mode Lockout**  
Allows the heating and cooling modes to be locked out based on the outdoor air temperature when an outdoor air sensor is connected.
- **Comm Addressing and Viewing**  
Allows communications addressing via the menu-driven user interface.
- **Heating and Cooling Stage Enable/Disable (TEC2002-3, TEC2003-3, and TEC2004-3 Models)**  
Reverts the operation of two-stage thermostats to a single-stage thermostat when the second heating or cooling stage is not needed.





**Figure 5: Front Cover**

### User Interface Keys

The user interface consists of five keys on the front cover as illustrated in Figure 5. The function of each key is as follows:

- Use the **YES/SCROLL** key to:
  - confirm menu selections and to advance to the next menu item
  - stop the Status Display Menu from scrolling and to manually scroll to the next parameter on the menu
- Note:** When the device is left unattended for 45 seconds, the display resumes scrolling through the Status Display Menu.
- Use the **NO** key to decline a parameter change and to advance to the next menu item.
- Use the **MENU** key to:
  - access the Main User Menu or to exit the menu
  - access the Installer Configuration Menu or to exit the menu
- **UP/DOWN** arrow keys change the configuration parameters and activate a setpoint adjustment.

### LEDs

Up to three LEDs are included to indicate the fan status, call for heat, call for cooling, call for auxiliary heat, or indicate heat pump compressor operation.

See Table 4 for information on the LEDs used on specific models.

**Table 4: LED Status Indicators**

LED	TEC2001-3, TEC2003-3, and TEC2004-3 Models	TEC2002-3 Model
FAN	Yes	Yes
HEAT	Yes	No
COOL	Yes	No
AUX HEAT	No	Yes
HEAT PUMP	No	Yes

- The **FAN** LED is on when the fan is on.
- The **HEAT** LED is on when heating or reheat is on.
- The **COOL** LED is on when cooling is on.
- The **AUX HEAT** LED is on when auxiliary heating is on.
- The **HEAT PUMP** LED is on when the heat pump compressor is on.

### LCD

The TEC Wireless Thermostat Controllers include a 2-line, 8-character backlit display. Low-level backlighting is present during normal operation, and it brightens when any user interface key is pressed. The backlight returns to low level when the device is left unattended for 45 seconds.

### Status Display Menu

The Status Display Menu is displayed on the LCD during normal operation. This menu continuously scrolls through these parameters:

- Room Temperature
- System Mode
- Schedule Status (Occupied/Unoccupied/Override)
- Outdoor Temperature – An outdoor air temperature sensor must be connected.
- Applicable Alarms – The backlight lights up as an alarm condition is displayed.

### **Main User Menu**

The Main User Menu allows the user to access and change the basic operating parameters:

- Temperature Setpoints
- System Mode
- Fan Mode

The Main User Menu uses Auto Help. Auto Help is displayed automatically in the Main User Menu when there is a pause in programming activity.

### **Installer Configuration Menu**

The Installer Configuration Menu allows the installer to set up the TEC Wireless Thermostat Controller for an application-specific operation. Table 5 shows the Installer Configuration Menu parameters by model.

**Table 5: Installer Configuration Menu Parameters by Model**

Installer Configuration Menu Parameters	TEC2001-3	TEC2002-3	TEC2003-3	TEC2004-3
Comm Address	Yes	Yes	Yes	Yes
PAN ID	Yes	Yes	Yes	Yes
GET FROM	Future Functionality - Not Available at This Release			
CHANNEL	Yes	Yes	Yes	Yes
DI1 and DI2 Input Configuration	Yes	Yes	Yes	Yes
Three Keypad Lockout Levels	Yes	Yes	Yes	Yes
Power Delay on Power Up	Yes	Yes	Yes	Yes
Frost Protection	Yes	Yes	Yes	Yes
Maximum Heating Setpoint/Minimum Cooling Setpoint	Yes	Yes	Yes	Yes
Anti-Short Cycle Times	Yes	Yes	Yes	Yes
Heating Stage Cycles per Hour	Yes	Yes	Yes	Yes
Cooling Stage Cycles per Hour	Yes	Yes	Yes	Yes
Heating/Cooling Minimum Deadband	Yes	Yes	Yes	Yes
Heating/Cooling Fan Control	Yes	Yes	Yes	Yes
End-of-Cycle Fan Delay	Yes	Yes	Yes	Yes
Temporary Occupancy Time	Yes	Yes	Yes	Yes
Room Air Sensor Calibration	Yes	Yes	Yes	Yes
Outdoor Air Sensor Calibration	Yes	Yes	Yes	Yes
Number of Heating Stages	No	No	Yes	Yes
Number of Cooling Stages	No	No	Yes	Yes
Number of Heat Pump Compressor Stages	No	Yes	No	No
Outdoor Air Temperature Heating Lockout	Yes	Yes	Yes	Yes
Outdoor Air Temperature Cooling Lockout	Yes	Yes	Yes	Yes
High Balance Point	No	Yes	No	No
Low Balance Point	No	Yes	No	No
Comfort/Economy Auxiliary Heat	No	Yes	No	No
Reversing Valve Operation	No	Yes	No	No
Heat Pump Compressor/Auxiliary Heat Interlock	No	Yes	No	No
Outdoor Air Temperature Changeover Setpoint	No	No	No	Yes
Outdoor Air Damper Minimum Position	No	No	No	Yes
Mechanical Cooling On/Off during Economizer Operation	No	No	No	Yes
Mixed Air Temperature Setpoint	No	No	No	Yes
Mixed Air Temperature Display	No	No	No	Yes

## Ordering Information

Use the information in Table 6 to order a TEC200x-3 Wireless Thermostat Controller for Staged Equipment Control. Use the information in Table 7 to order a TEC20 Coordinator. Use the information in Table 8 to order accessories.

## Repair Information

If the TEC Wireless Thermostat Controller System for Staged Equipment fails to operate within its specifications, replace the unit. For a replacement, contact the nearest Johnson Controls representative.

**Table 6: TEC200x-3 Wireless Thermostat Controllers for Staged Equipment Control**

Product Code Number	Description	Applications
TEC2001-3	Single-Stage	Fan Coil Units, Unit Heaters, and Single-Stage Packaged Heating/Cooling Equipment
TEC2002-3	Heat Pump	Heat Pumps with Up to Three Heating and Two Cooling Stages
TEC2003-3	Multi-Stage	Multi-Stage Packaged Heating/Cooling Equipment
TEC2004-3	Multi-Stage Economizer	Economizer Operation for Single- and Multi-Stage Unitary Rooftop Equipment

**Table 7: TEC20 Coordinators**

Product Code Number	Description
TEC20-3C-2	BACnet IP Wireless Coordinator; Requires 15 VDC Power Supply
TEC20-6C-2	BACnet MS/TP Wireless Coordinator; Requires 15 VDC Power Supply

**Table 8: TEC Wireless Accessories (Order Separately)**

Code Number	Description
SEN-600-1	Remote Indoor Air Temperature Sensor
SEN-600-4	Remote Indoor Air Temperature Sensor with Occupancy Override and LED
TE-636S-1	Strap-Mount Temperature Sensor
TE-6361M-1 <sup>1</sup>	Duct-Mount Air Temperature Sensor
TEC20-A-1	Replacement Antenna for TEC20 Coordinator
TEC20-RA-1	Remote Antenna for TEC20 Coordinator when it is Installed Inside a Metal Cabinet or when Remote Antenna Mounting is Required by Physical Installation
TEC20-7X-1	24 VAC to 15 VDC Panel-Mounted Power Supply
TEC20-8X-1	120 VAC to 15 VDC Power Supply
TEC20-9B-1	Replacement Battery Pack for TEC20 Coordinator

1. Additional TE-636xx-x Series 10k ohm Johnson Controls Type II Thermistor Sensors are available; refer to the *TE-6300 Series Temperature Sensors Product Bulletin (LIT-216320)* for more details.

## Technical Specifications

### TEC20 Wireless Coordinator

<b>Product Code Numbers</b>	<b>TEC20-3C-2:</b> BACnet IP Version <b>TEC20-6C-2:</b> BACnet MS/TP Version
<b>Power Requirements</b>	15 VDC, 6 W Maximum
<b>Platform</b>	IBM® PowerPC® 405EP 250 MHz Processor 64 MB SDRAM and 64 MB Serial Flash Battery Backup - Shutdown Begins within 10 Seconds Real-Time Clock - 3 Month Backup Maximum with Battery
<b>Operating System</b>	Niagra <sup>AX</sup>
<b>Communications</b>	<b>Ethernet:</b> Two 10/100 Mbps Ports (RJ-45 Connection) <b>RS-232:</b> 9-Pin D-Shell Connection <b>RS-485:</b> 3-Pin Non-Isolated Port
<b>Transmission Range</b>	<b>Through Walls:</b> 10 m (30 ft) <b>Line-of-Sight (Open Space):</b> 30 m (100 ft)
<b>RF Band</b>	Direct-Sequence, Spread-Spectrum Transmission; 2.4 Ghz Unlicensed Band
<b>Transmission Power</b>	10 mW Maximum
<b>Wire Size</b>	18 AWG Maximum, 22 AWG Recommended
<b>Ambient Conditions</b>	<b>Operating:</b> 0 to 50°C (32 to 122°F); 95% RH Maximum, Noncondensing <b>Storage:</b> -20 to 60°C (-4 to 140°F); 95% RH Maximum, Noncondensing
<b>Compliance</b>	<b>United States:</b> UL Listed, File E27734, CCN XAPX, Under UL 873, Temperature Indicating and Regulating Equipment FCC Compliant to CFR 47, Part 15, Subpart B and Part 15 Class A  <b>Canada:</b> C-UL Listed, File E207782, CCN XAPX7, Under CAN/CSA C22.2 No. 24, Temperature Indicating and Regulating Equipment, and C22.2 No. 205-M1983 Signal Equipment Industry Canada, ICES-003
<b>Dimensions (H x W x D)</b>	122.4 x 160.4 x 61.9 mm (4.820 x 6.313 x 2.438 in.)
<b>Shipping Weight</b>	1.1 lb (0.499 kg)

### TEC200x-3 Wireless Thermostat Controllers (Part 1 of 2)

<b>Power Requirements</b>	19 to 30 VAC, 50/60 Hz, 2 VA (Terminals RC and C) at 24 VAC Nominal, Class 2 or Safety Extra-Low Voltage (SELV)
<b>Economizer Output Rating</b>	<b>TEC2004-3 Model:</b> 0 to 10 VDC into 2k ohm Resistance (Minimum)
<b>Relay/Triac Contact Rating</b>	30 VAC, 1.0 A Maximum, 3.0 A In-Rush, Class 2 or SELV
<b>Digital Inputs</b>	Voltage-Free Contacts across Terminal C to Terminals DI1 and DI2
<b>Transmission Range</b>	<b>Through Walls:</b> 10 m (30 ft) <b>Line-of-Sight (Open Space):</b> 30 m (100 ft)
<b>RF Band</b>	Direct-Sequence, Spread-Spectrum Transmission; 2.4 Ghz Unlicensed Band
<b>Transmission Power</b>	10 mW Maximum
<b>Wire Size</b>	18 AWG Maximum, 22 AWG Recommended
<b>Temperature Sensor Type</b>	Local 10k ohm Negative Temperature Coefficient (NTC) Thermistor
<b>Resolution</b>	±0.1C°/±0.2F°
<b>Accuracy</b>	<b>Temperature:</b> ±0.5C°/±0.9F° at 21.0°C/70.0°F Typical Calibrated
<b>Temperature Range</b>	<b>Backlit Display:</b> -40.0°C/ -40.0°F to 50.0°C/122.0°F <b>Heating Control:</b> 40.0°F/4.5°C to 32.0°C/ 90.0°F in 0.5° Increments <b>Cooling Control:</b> 54.0°F/12.0°C to 38.0°C/100.0°F in 0.5° Increments

## TEC200x-3 Wireless Thermostat Controllers (Part 2 of 2)

<b>Auxiliary/Outdoor Air Temperature Indication Range</b>	-40.0°C/-40.0°F to 50.0°C/122.0°F
<b>Minimum Deadband</b>	1C°/2F° between Heating and Cooling
<b>Ambient Conditions</b>	<b>Operating:</b> 0 to 50°C (32 to 122°F); 95% RH Maximum, Noncondensing <b>Storage:</b> -30 to 50°C (-22 to 122°F); 95% RH Maximum, Noncondensing
<b>Compliance</b>	<b>United States:</b> UL Listed, File E27734, CCN XAPX, Under UL 873, Temperature Indicating and Regulating Equipment FCC Compliant to Part 15.247 Regulations for Low Power Unlicensed Transmitters  <b>Canada:</b> UL Listed, File E27734, CCN XAPX7, Under CAN/CSA C22.2 No. 24, Temperature Indicating and Regulating Equipment Industry Canada, ICES-003
<b>Dimensions (H x W x D)</b>	125 x 86 x 29 mm (4-15/16 x 3-3/8 x 1-1/8 in.)
<b>Shipping Weight</b>	0.34 kg (0.75 lb)

*The performance specifications are nominal and conform to acceptable industry standards. For application at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products.*

### United States Emissions Compliance

#### Compliance Statement (Part 15.19)

*This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:*

- 1. This device may not cause harmful interference, and*
- 2. This device must accept any interference received, including interference that may cause undesired operation.*

#### Warning (Part 15.21)

*Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.*

#### RF Exposure (OET Bulletin 65)

*To comply with FCC RF exposure requirements for mobile transmitting devices, this transmitter should only be used or installed at locations where there is at least 20cm separation distance between the antenna and all persons.*

### Canadian Emissions Compliance

#### Industry Canada Statement

*The term IC before the certification/registration number only signifies that the Industry Canada technical specifications were met.*

*Le terme « IC » précédant le numéro d'accréditation/inscription signifie simplement que le produit est conforme aux spécifications techniques d'Industry Canada.*

#### Section 5.5 of RSS-210

*This device has been designed to operate with an antenna having a maximum gain of [x] dB. Antenna having a higher gain is strictly prohibited per regulations of Industry Canada. The required antenna impedance is [y] ohms.*

*Cet appareil a été conçu pour fonctionner avec une antenne d'un gain maximum de [x] dBi. En application des réglementations d'Industry Canada, l'utilisation d'une antenne de gain supérieur est strictement interdite. L'impédance d'antenne requise est de [y] ohms.*

#### Section 5.11 of RSS-210

*To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (EIRP) is not more than that required for successful communication.*

*Pour réduire les interférences radio potentielles avec les dispositifs d'autres utilisateurs, le type d'antenne et son gain doivent être choisis de façon à ce que la puissance isotrope rayonnée équivalente (PIRE) ne soit pas supérieure à la puissance nécessaire pour une bonne communication.*



**Building Efficiency**  
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